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Sky-View of Budd All-Steel Automobile Body Plant in Philadelphia; Midvale Steel Co. in Central Background; Atwater-Kent Radios are Built in Two-Story Buildings at Left

Steel Required in Automobile Bodies

Special Qualities in Sheets More Successfully Obtained
by Showing Steel Manufacturers Exact Requirements Than by Buying on Strict Specifications

AN interesting example of how the use of sheet metal expands into new fields is found in the plant of the Edward G. Budd Mfg. Co., Philadelphia. Just 15 years ago a small group of men who believed in the superiority of the all-steel automobile body started in business; the first bodies were made somewhat like custom bodies would be made today—with a large expenditure of labor and a relatively small amount of equipment. In the intervening years, thanks to intensive development of special machines and labor-saving equipment, the Philadelphia plant has grown until its present capacity is on the order of one million complete bodies per year and additional capacity exists in plants in Detroit, England and Berlin.

Advantages of Sheet Metal

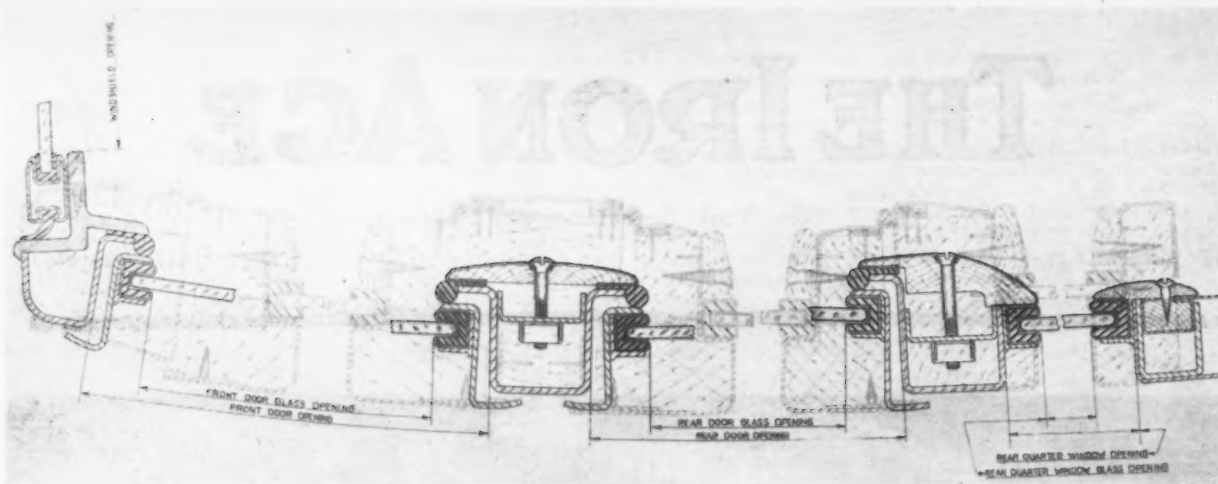
The reasons for a steel automobile body are much like those for steel railroad coaches, but for some dozen years they were known or considered principally by the technicians in the automotive industry; more lately the buying public has become acquainted with them.

From the users' standpoint: A welded all-steel body is in effect jointless, a single piece; the various parts do not rub, nor develop squeaks or leaks. It is long lived and consequently gives the car a higher trade-in value. Strong, slender door posts and window frames give increased vision. Most important of all, it is safer—in the event of accident, the body does not crush in or catch fire. Finally its gross weight is less than the composite body, thus reducing operating expenses, principally for tires.

From the manufacturers' standpoint the advantages of all-steel are equally apparent. Steel is a better building material than wood, because it is much stronger and stiffer in equal section, and the material can be more easily shaped into economical forms and sections to resist the imposed load. Permanent joints in steel may be made without the mortising operations necessary in wood, which remove portions of one member where the material is needed most. Steel is more uniform in quality and not pronouncedly weak across the grain, as is wood, and is unaffected by weather changes. It therefore lends itself more readily to standardized quantity production of interchangeable units, thus speeding the time of completion and reducing the amount of material in process. An all-steel body can be baked with impunity for de-greasing, enamelling or other finishing operations, something which may be done only to the most moderate extent with a wooden skeleton, covered with sheet metal.

Despite the impression which may exist that steel would be refractory material to bend and mold into the rounded forms demanded by fashion, experience proves it to be well adapted for this purpose. It permits much latitude in the body design, and requires less bulk for the required strength, thus giving greater vision and more roomy interiors.

For these reasons the all-steel body has been used to the extent that (according to the Budd company's figures) one out of every three passenger automobiles made in 1926 had all-steel bodies, a number of leading



Cross Sections of Posts on All-Steel Sedan Bodies, Compared to the Sections of Composite Construction, Shown Phantom

manufacturers using them extensively in America, England, France and Germany.

Not only has this development consumed important tonnages of sheet steel, but it has also influenced the design of composite bodies to the end that a greater and greater amount of steel is going into those types, until today it has almost enough for a self-supporting structure.

Steel Bought on "Understanding"

An essential factor in the success of the all-steel body is the ability to secure sheet steel having the combined properties of high surface finish and good drawing qualities. To a degree these two are antagonistic. The best and smoothest surface necessary to take the mirror-like enamelled or lacquered finish demanded by the motorist is acquired by cold rolling in the finishing passes. This, however, causes work-hardening in the sheet, reducing its ductility and its ability to take further deformation in the stamping presses.

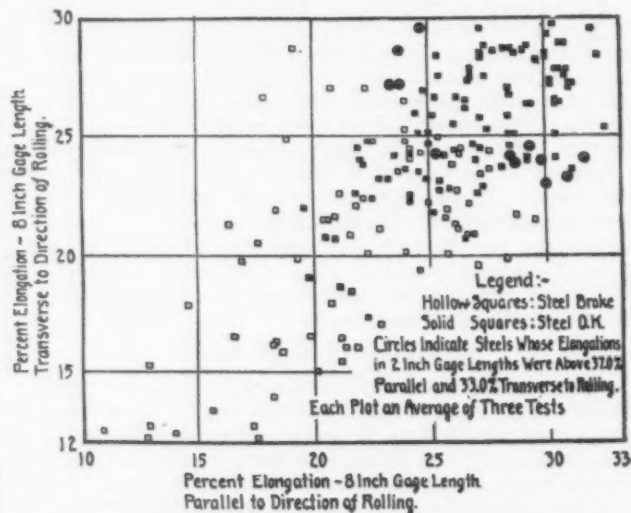
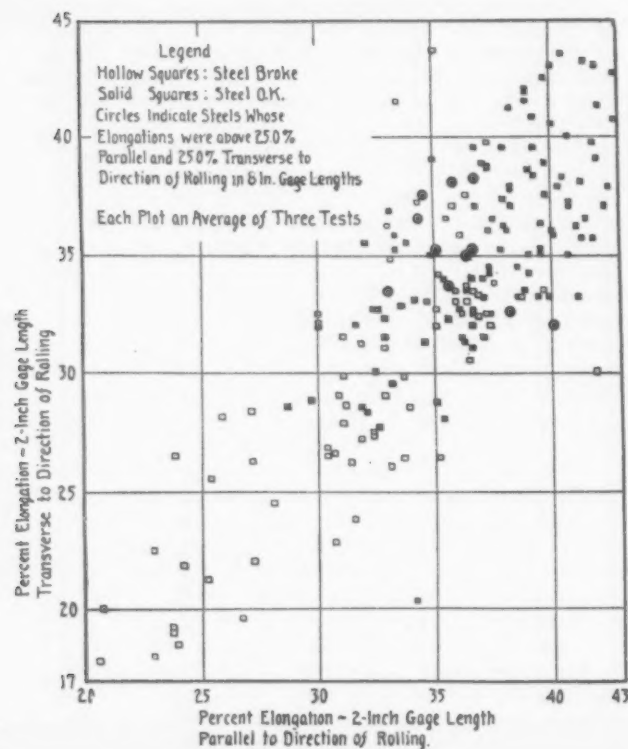
To balance these two opposing factors is a distinctively steel-making problem, and it has been in process of solution since the beginning of the all-steel body production, 15 years back. That a reasonably good commercial solution has been effected is evidenced by

the fact that the Edward G. Budd Mfg. Co.'s Philadelphia plant absorbs sheet steel at the rate of 165,000 tons per year when working at capacity.

Body stock is bought by them on "understanding" rather than on "specification." Budd's metallurgical staff has always insisted that the best way to develop better steel for its purposes is to take the steel makers into its confidence, show them exactly what the steel is expected to do, point out clearly any feature in a new die design or body finish which probably puts a new demand on the metal, and then ask the steel makers to deliver sheets for that purpose unhampered by any chemical or physical specification.

That does not mean that Budd engineers do not have pretty definite ideas as to what chemical analysis and what ductility and thickness tolerances would be best for their purpose. Experience has shown them that a sheet should be about 0.04 in. thick to avoid drawing out too thin at the corners, or to be filed too thin in finishing operations, as well as to have enough body to resist dents in normal handling.

This tendency toward standardization on one thickness, which the steel makers are able to deliver within close tolerances, has simplified the construction and operation of dies, jigs and welding machines, and in the accounting and routing of material in process, thus resulting in economies which offset any savings in



Studies of Ductility of Deep Drawing Stock. Three long strips were cut from each sheet parallel to direction of rolling and three at right angles. These were gaged at 2 and 8 in. and tested in tension. Elongations measured on the 2 in. gage length plotted in large diagram; elongations measured over 10 in. plotted on the small diagram

weight to be expected from using thinner sheets in unimportant places.

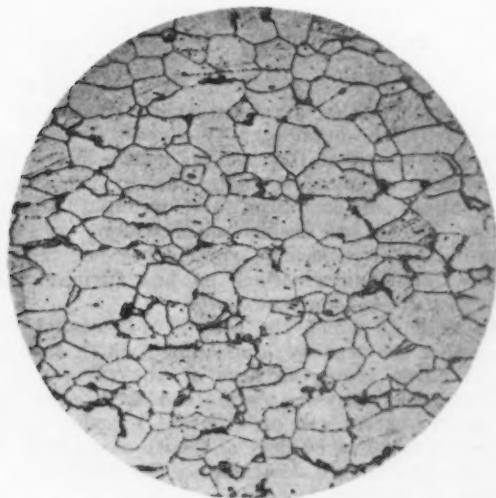
Elongation the Criterion for Successful Stamping Steel

Furthermore, study of a number of successful and unsuccessful heats has shown* that trouble in forming is never experienced when the sheets have elongations as determined on test strips better than either of the following limits:

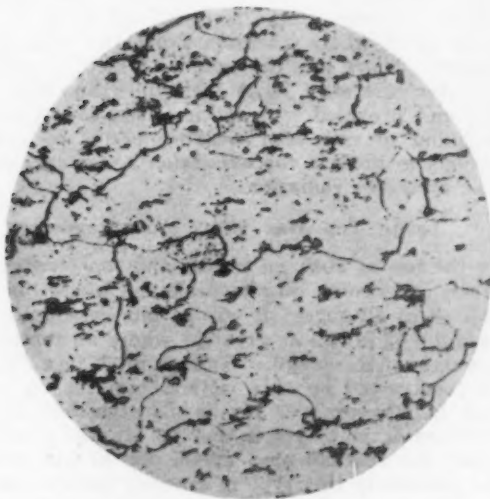
A: Elongation in 2-in. gage length: With rolling, 37 per cent and across rolling, 34 per cent.

B: Elongation in 8-in. gage length: With rolling, 25 per cent and across rolling, 25 per cent.

An average of six samples from each sheet.



*Normal Grain Size of Box-Annealed Sheet.
Magnification 100 diameters*



Grain Size Often Obtained When Conditions Are Such as to Cause Exaggerated Grain Growth. Such sheets liable to cracking on first or subsequent draw

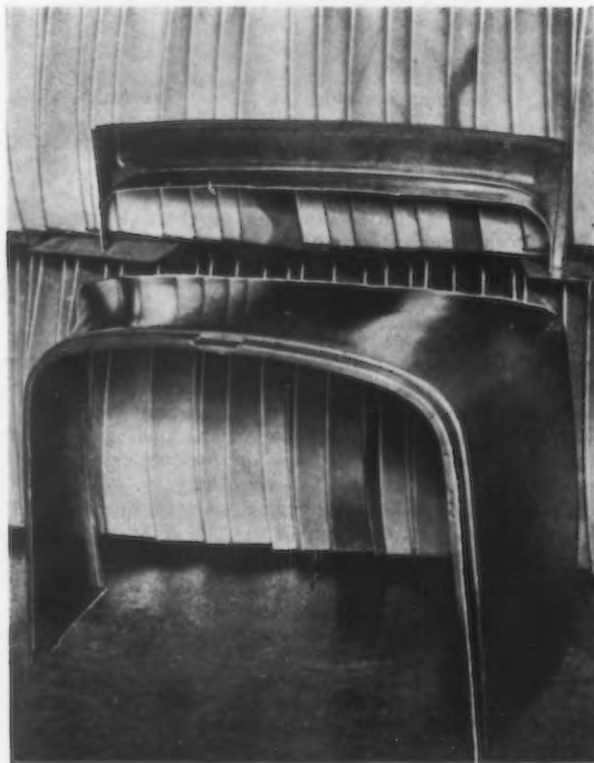
If a certain stamping does give trouble, and a test on the sheet metal shows a ductility uniformly equal to or better than those figures, the trouble is looked for in the dies or press shop practice. However, if a stamping develops an undue number of rejects in a new lot of steel, and that steel on test gives a ductility below the limits noted, when measured either on the 2-in. gage length or the 8-in. gage length, then the steel maker is notified that the "bug" is in his material. Thus the Budd company's unwritten steel specification is used to appraise their own manufacturing practice, rather than to determine the steel company's operations.

*J. Winlock and G. L. Kelley, of the Budd company, discussed this matter before the 1927 convention, American Society for Steel Treating, in a paper entitled "Testing Automobile Body Sheet Steel."

Such a purchasing method has several advantages. It puts the responsibility of producing a steel for a particular purpose on the shoulders of the steel maker, rather than on his customer. It procures a special grade of sheet known to the trade as "extra deep drawing," commanding a premium, but not so expensive as it would be if definite chemical and physical specifications would have to be met.

Furthermore, it avoids the necessity of close sampling on receipt. Inspection for surface finish is made at the mill. Each body sheet is inspected individually at the Budd plant upon unloading, and if the top surface is satisfactory it is marked with a rubber stamp; if not, the sheet is turned over in the hope that the other side is passable. If neither side is, it is rejected; but such rejections are infrequent.

No physical tests are made unless the lot develops trouble in the press shop. This in itself is an economy, for so much variation can be expected from sheet to sheet, and even in different parts of a single sheet, that to make a fair sample would require cutting up at least

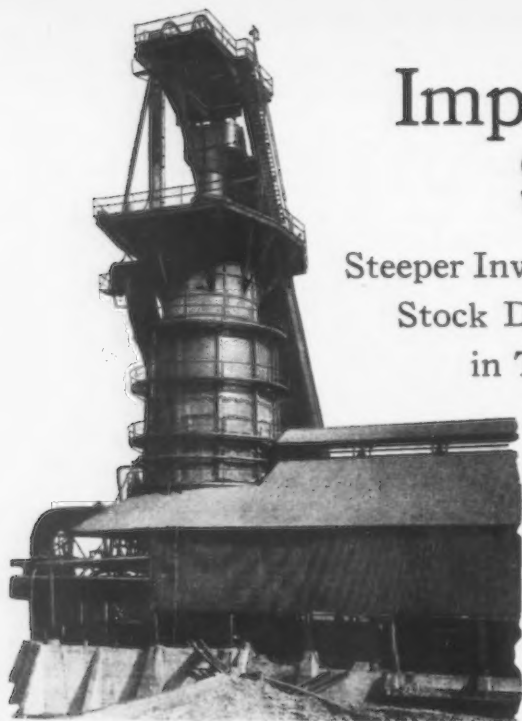


Cowl Stamping, Made from Single Flat Steel Sheet, Showing Possibilities of Rounded Forms Combined with Square Flanges and Graceful Panels

5 per cent of the shipment for test pieces in various parts of the sheet. It seems good management to avoid this unless trouble develops in fabrication; then a "clinic," attended by the manufacturers' representatives, is held. Of course, when this occurs so often as to delay press shop operations seriously, it is time to get sheets from an alternative source of supply.

Of the 2,764,000 motor trucks in use in the United States, only 497,000 are classified by the National Automobile Chamber of Commerce as commercial carriers. The remaining 82 per cent are owned by shippers, including department stores, groceries and numerous other similar owners. Of the commercial carriers, 304,000 are classified as contract carriers while 193,000, or 7 per cent of the total, are known as common carriers.

Following a shutdown of five months, one of the largest New England manufacturers of fire arms will resume operations effective Oct. 3 with a full working force of approximately 600 hands.



Improved Furnace on Southern Ores

Steeper Inwalls, Water Cooled, Permit More Uniform Stock Distribution with Corresponding Gains in Tonnage and Lowered Coke Ratio

BY J. P. DOVEL*

SINCE 1910 the writer has patented a series of improvements to blast furnace construction, the main features of which have been incorporated gradually into the stacks of the Sloss-Sheffield Steel & Iron Co. at Birmingham, Ala. When it became necessary to reconstruct old furnace No. 2, it was considered that sufficient satisfactory experience with these innovations had been accumulated to warrant incorporation of all of them in the new stack. New No. 2 furnace (as shown in the photograph and the detailed drawing) is now on production, and has come up to expectations in every way.

With four of these furnaces now in operation, it is my purpose in this paper to give a brief description of this type, and set out some of the reasons why it is claimed to be a better furnace, and why it operates better than is possible with the old type.

The hearth construction may be of any suitable design. I prefer a heavy cast iron hearth jacket at least 13 in. thick, made up in sections of suitable size. The size of the hearth proper, or crucible, is to be determined by the size of the cast and not by the other general dimensions of the furnace. Excess crucible area is objectionable since it tends to lower the grade of iron produced, especially as to physical structure, and to cause irregular casting conditions.

No inside cooling is required at any point below the tuyeres, but the hearth should be cooled on its outer surface by water sprays and the ordinary well construction. The principal advantage of this well is that it prevents breakouts and the accumulation of heat in the extreme bottom of the crucible and its foundations. Therefore this type of crucible is desirable from a safety viewpoint. If it should spring a leak, the molten iron could not cut away this heavy cast iron very fast; therefore it could not rush through quickly and little damage would result. Seven furnaces using this hearth have had no breakout in fifteen years' service.

Bosh Built Inside Metal Jacket

A tuyere jacket is provided of similar construction, provided with openings for tuyere coolers and for at least two bronze cooling plates between. The latter should be located on a horizontal plane with the tuyeres and extend nearly as far as to the nose of tuyere coolers.

Directly above the tuyere jackets are located three or four rows of bronze cooling plates, thrust through a series of cast iron housings (securely bound together by means of steel bands, thus forming the lower

part of bosh) all so arranged that replacement can be made from the outside.

The upper part of the bosh, as shown in the drawing, consists of a steel plate jacket, protected by cooling plates of cast iron and wrought pipe construction, placed just inside and extending well above the mantel. This bosh construction has had ten years of almost continuous service on one furnace and is still in first-class condition.

The angle to which the bosh is constructed should be such that the true working angle (which represents a slight curve from the nose of the tuyeres to the spring of bosh) may be maintained, with some allowance for using tuyeres of different lengths. A bosh constructed to 79 to 80 deg. and with a working angle of 77 deg. has proved desirable on Southern ores with this type of furnace.

Column and mantel construction may be of any standard design. Inwall is protected throughout by several rows of bronze cooling plates, connected to and supported by the shell, and built so they can be detached or inserted from the outside. An independent lining of brick 22½ in. or 27 in. thick is used up to a point where abrasion from the stock would commence. Above this the wall is of metal, consisting of an outer cast steel jacket, machined and bolted together, and provided with bolting lugs to support an inner lining of cast iron wearing plates of suitable dimensions to provide for expansion and wear, and to prevent excessive radiation.

Large Top Has Many Advantages

By the use of such an inwall and top construction (which is practically indestructible and whose lines are maintained at all times) it will be unnecessary to provide a pitch of inwall as great as where an inwall will become uneven in service. While a pitch in a furnace inwall constructed by this method requires ½ in. or less per ft., the practice in the old style has been to give it from ¾ in. to 1¼ in. per ft. It will readily be seen that the relative area at the top of the furnace will be greater in this type of furnace than in the old type. This increases the total area for stock. This additional stock acts as a recuperator on the hot gases, thereby delivering the gases at the downcomer at a lower temperature and making a direct saving in the heat units retained in the furnace.

A further advantage in this type of furnace, due to its indestructible inwall and top construction, is that it is possible to use a relatively smaller bell. This results in throwing more coarse material to the walls, causing the furnace to work freely along the wall as well as through the middle, thus insuring a rate of travel impossible in a furnace wherein it is necessary to work fine material to the outside for the protection of the inwall (a practice very common today on the old style furnace). The largest practical area in the upper section of the furnace is desirable; if the area is sufficient and the distribution of stock uniform throughout, the upward passing gases will filter slowly through the stock and not be forced rapidly through openings or craters, picking up large quantities of dust.

This slow and easy movement of the upward passing gases, filtering through the stock uniformly,

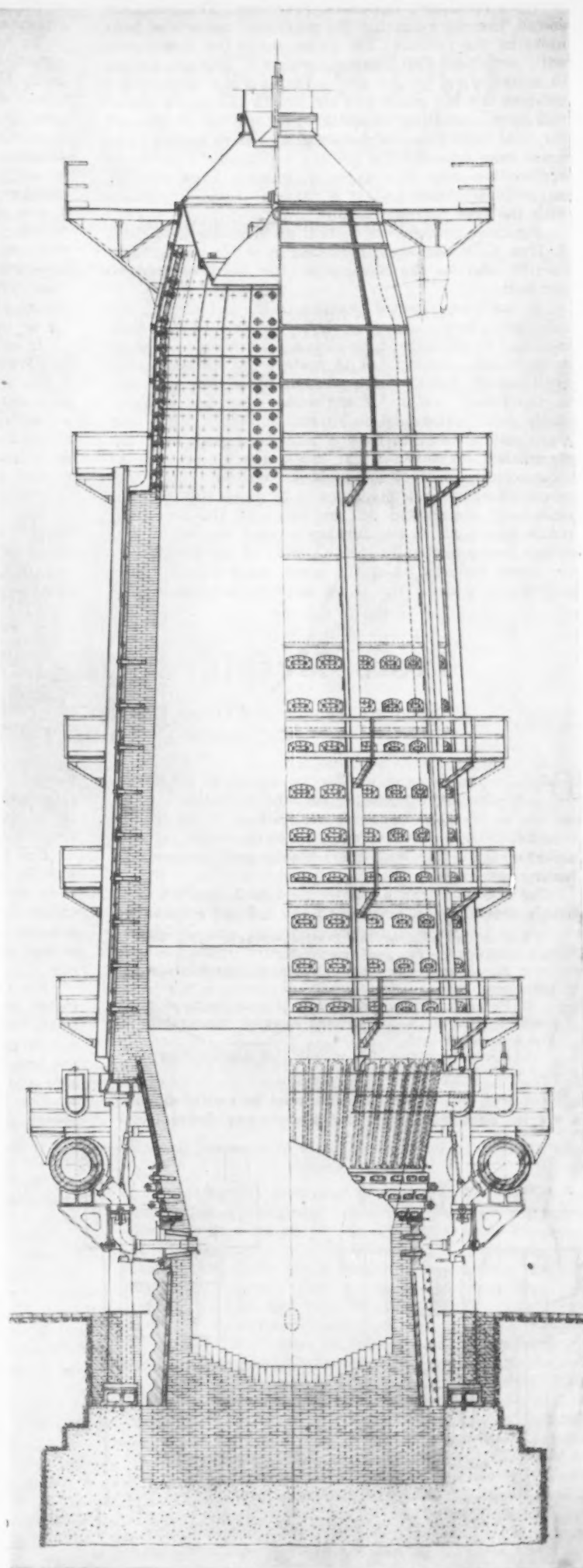
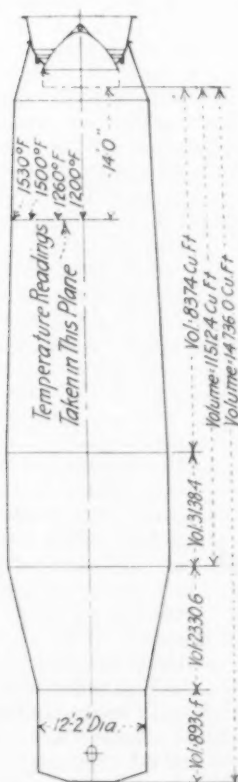
*Vice-president Sloss-Sheffield Steel & Iron Co.

DETAILS of the No. 2 Stack, Are Shown in the Drawing to the Right, While the Table and the Diagram Below Cover the Operating Data on the No. 4 Furnace

Coke used per month (31 days), tons		13,175
Coke used per ton of iron, lb.		2,690
Stone used per month, tons		1,759
Stone used per ton of iron, lb.		402
Ore charged during month, tons		23,440
Gross burden charged, tons		25,199
Iron produced, tons		9,796
Gross burden charged per ton of iron produced, tons		2.55
Ratio of carbon to gross burden		1:2.42
Average analysis of ore charged ...	Silica	14.27
	Alumina	3.42
	Lime (CaCO ₃)	21.13
	Phosphorus	0.286
	Manganese	0.70
Coke	Volatile	1.73
	Fixed carbon	85.08
	Ash	13.19
	Sulphur	0.76
	Moisture	5.75
Dolomite	Silica	0.79
	Alumina	0.50
	CaCO ₃	55.96
	MgCO ₃	42.75
Ave. analysis of slag	Silica	38.47
	Alumina	13.43
	Lime (CaO)	47.13
Ave. analysis of pig iron produced ..	Silicon	2.52
	Sulphur	0.028
	Manganese	0.50
	Phosphorus	0.75

Grade: Foundry

Coke burned per day per sq. ft. of hearth area at plane of nose of coolers, lb.		7,312
Coke burned per day per cu. ft. of entire volume including hearth, lb.		57.68
Coke burned per day per cu. ft. of volume between top of bosh and 2 ft. below closed bell, lb.		73.92
Air blown, cu. ft per min.		32,000
Blast temperature (ave.), deg. Fahr.		1,325
Capacity of hearth, 100 tons of iron.		



serves several very important functions: The gases are cooled, thereby retaining the maximum amount of heat units in the furnace; the gases reach the downcomer with very low dust content, which is a great saving in material; a longer and better contact is provided between the hot gases and the ore in the upper reduction zone, resulting in better preparation of the ore for final reduction, and better grade, more tonnage and lower coke consumption per ton produced. This is the explanation why this type of furnace runs steadily on uniform grade and at a rate of travel impossible with the type commonly built.

By these changes on several of Sloss-Sheffield Steel & Iron Co.'s furnaces, including new No. 2, the dust carried over to the downcomer has been reduced 90 per cent.

It has been common practice in the industry to use relatively large charging bells to throw the finer material to the walls, thus causing the furnace to work more to the center so as to protect the walls—a very good reason, for no brick without protection will stay in the inwall section of a furnace that has uniform stock distribution and is driven rapidly. Much has been said about distribution and much has been accomplished, as some of the stock distributors are as mechanically perfect as could be desired. But this whole effect of such machines is to place the material uniformly distributed on the bell. If the bell then places this stock in the furnace in such manner that a crater forms vertically in the center of the furnace as the stock reduces, then the stock must fall in from somewhere around the walls without any regularity

at all, and we only can have an irregular working condition with all its attendant evils.

It has been definitely determined that the indestructible inwall and top construction, with increased areas in upper section of the furnace together, with better distribution of the stock from the bell, have greatly raised the ultimate limit of production, and have reduced coke consumption per ton of iron. The ultimate possibilities have not yet been fully determined, but probably are 50 per cent increase in production and 15 per cent saving of coke. Furnace No. 4, (an operating chart of which is given) when changed to this type, has shown 30.4 per cent increase in production, and a decrease in coke of 12.9 per cent. If hot-blast can be maintained at normal, production on this furnace can be raised further, as we have not yet reached the ultimate practical limit of volume of air or heat that this furnace will take.

It is believed that the notably increased production and lower coke consumption of this furnace are due to a relatively larger area in its upper part and the rearrangement of the furnace lines, together with stock so distributed by the bell as to place a sufficient amount of coarse material along the walls, as well as in the center, thus causing the upward passing gases to flow uniformly through the whole mass, and maintain a uniform temperature and flow throughout the furnace. This brings into active service every cubic foot of space, and approaches ideal operating conditions, as there is no cause left for heavy slips or the burning of bronze coolers with the accompanying expense and delays.

Tests Metals at High Temperatures

Accurate Tensile and Other Results Claimed for New Amsler Apparatus
—Compression and Other Tests Possible

DUE to the demand of the metallurgical industries for efficient apparatus for the investigation of metals at elevated temperatures, Alfred J. Amsler & Co., Schaffhouse, Switzerland, have developed special accessories for use with their tensile and compression testing machines.

The special furnace, shown in Fig. 1, applied to a tensile machine can be used in the following manner:

1. For determining the tensile strength of a test bar at a definite elevated temperature.
2. For determining the yield point at elevated temperatures.
3. For determining the period of time required to break a test bar at a constant elevated temperature and a constant load.
4. For determining the modulus of elasticity of a bar at elevated temperatures.

For test No. 3, the machine must be equipped with a special apparatus, able to maintain any desired load

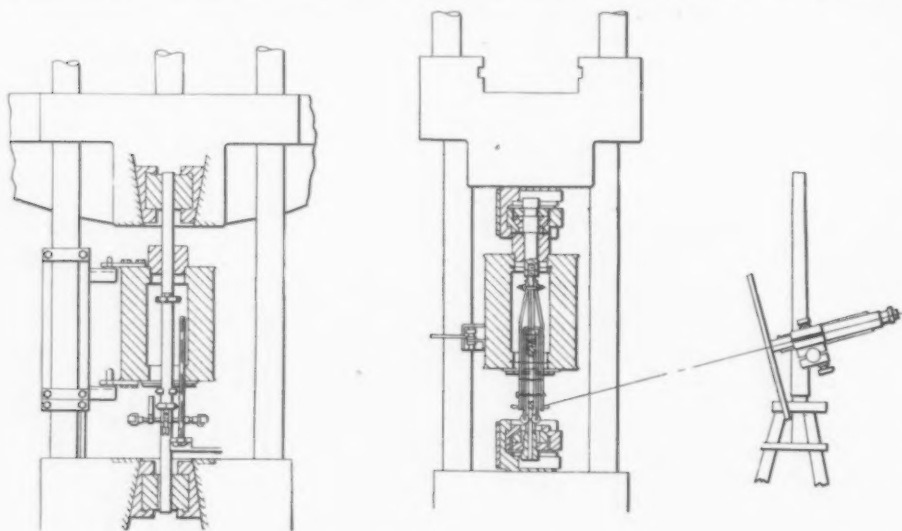
within the capacity range of the machine, automatically constant, for any desired period, independently of the elastic and plastic deformation which the bar undergoes during such period.

For tests of this kind, the Amsler tensile machines provide that the load-measuring apparatus automatically counterbalances the loads applied during each entire testing operation, until the bar actually breaks. Automatic load-maintaining apparatus for these machines was developed by Doctor Amsler a few years ago.

For test No. 4, the Amsler-Martens mirror extensometer, shown in Fig. 2, is used. For high-temperature tests, this apparatus is equipped with special comparison strips and clips for transmitting the elongation of the test bar from the inside of the furnace to the outside and is able to withstand high temperatures.

The Amsler electrical furnace is a cylindrical body, shown in cross-section in Figs. 1 and 2. It is suspended from two hinges which are fastened to one of the columns or to the frame of the testing machine. In order to introduce a specimen, the furnace is swung out of the axis of the machine. Rheostat, thermocouple and millivoltmeter for the regulation and measurement of the temperatures applied form a standard equipment. The apparatus can also be applied to compression tests and, in connection with a pulsator, to repeated stress (fatigue) tests at high temperatures.

This equipment is obtainable in the United States and Canada from Herman A. Holz, testing engineer, 17 Madison Avenue, New York, American representative of the Amsler Works.



Amsler Apparatus for High Temperature Tests of Metals, Including Tensile Strength, Yield Point and Modulus of Elasticity

The Steel Industry Since 1900

Increase in Productivity in United States Due to Enlarged and Improved Equipment Rather Than to Fundamental Changes in Process

BY THEODORE W. ROBINSON*

THE United States during the past few years has been experiencing the unprecedented economic condition of continuously falling commodity prices, high wages and continued prosperity. Any intelligent attempt to explain this anomaly must recognize certain elementary economic principles.

It is clear that wealth cannot be divided until it is produced, and obviously the more there is produced by each workman the more there is to be divided. Wages and dividends are primarily matter of wealth's distribution—not of its production. High wages mean high consumption. The larger the output of the individual workman the greater is the tendency to lower costs and the greater the possibilities of return in wages and in dividends. Present easy money and low inventory are factors that influence but do not answer the question before us. High wages as a matter of distribution instead of production are an effect rather than a cause, and raw material, of which our forefathers had much more than we, is but of potential value until converted.

These are elements that enter into a complex problem, but do not explain it. Neither would increased production if accomplished merely by a proportional increase in the number of workers. The true answer to this economic paradox of combined high wages and lowering price of goods, and the underlying primary cause of the late industrial progress of the United States, lie in the increased and unrivaled output of the individual American workman, and the large accumulation of wealth that has resulted from it.

Large Gain in Productivity of American Workman

The extent of this wealth is indicated by figures recently compiled by the National Industrial Conference Board from Washington statistics. These show that the value of the yearly product of the average workman in all manufacturing industry of the United States rose from a per capita production value of \$3,214 in 1904 to \$4,682 in 1925, as measured by the common purchasing power of the 1914 dollar. This represents an increase of 45.7 per cent in the manufacturing output of the average individual workman, which if applied to the total volume of manufactured product signifies that the increase of wealth in 1925 due solely to the increase in per capita production amounted to \$12,304,000,000 more than it would have been had the output of the average worker been no greater than it was in 1904: in other words, one-third of all the wealth that was produced that year from the nation's manufacturing industry was directly due to the increased productivity of the average individual workman.

How profound an influence such vast sums have on the whole economic structure of the country is perhaps better visualized when it is realized that 12.3 billions of dollars, on the basis of present individual production, is equivalent to the output of 2,628,000 men, a number equal to nearly one-third of the entire working force of the United States engaged in the manufacturing industry. That the productive efforts of such

a vast army of workers can be laid aside by machinery and management and rendered available for other additional work without an average increase in the country's non-employment is a striking commentary on the stimulating and absorbing effect of increased individual production.

An explanation of the increased efficiency attained by the manufacturing industry of the United States is found in the development of its iron and steel production. Of all basic industries the manufacture of iron and steel ranks first in fundamental importance and second in the amount of wages paid.

In 1901 the United States with its output, in round numbers, of 13,500,000 tons of ingots and castings, produced 44 per cent of the world's steel. This by 1926 had expanded to more than 51 per cent of the world's total with its production of over 48,000,000 tons of steel. Whereas 25 years ago the steel ingots made in the United States consisted of more than 66 per cent acid Bessemer, nearly 84 per cent of the steel now produced is of basic open-hearth. This, in brief, tells the nation's accomplishment for the first quarter of the century, and records the large replacement of the Bessemer converter by the open-hearth furnace, a change superinduced by the changing character of the country's ore reserve.

The causes for this impressive growth, while clearly complex, are largely predicated upon economic and social change rather than upon any pronounced technical difference in method of manufacture. In principle the blast furnace, open-hearth, Bessemer converter and rolling mill are still the unchanged agents of reduction and conversion, and there has been but little progress made in the fundamental metallurgy of iron and steel during the twentieth century. Momentous advances in technique and the refinement in operation have resulted in an increase of output which can be attributed only partially to a multiplication of plants.

Marked Increase in Per Capita Output at South Chicago Works

The production records of the past 25 years at the South Chicago works of the Illinois Steel Co. furnish a concrete illustration of the effect of such advances. This works represented in 1901, as it does now, the best modern practice. The average daily output of each of the South Chicago blast furnaces increased from 318 tons in 1901 to 679 tons in 1926. During this period the acid Bessemer department increased its production from 70,000 tons to 100,000 tons per month, and the basic open-hearth furnaces increased from an average output per furnace of 586 tons per week to 1379 tons per week. The South Chicago rail mill had an average capacity of 60,000 tons per month in 1901, while the Gary rail mill, by which it has been replaced in the rolling of rails, has a capacity of 100,000 tons per month. These figures reasonably illustrate the unit advance in physical production which has taken place in the iron and steel industry in the United States.

A still more important development in American practice is the increased per capita output of the average iron and steel workman. This is strikingly illustrated by the following South Chicago records:



T. W. ROBINSON

*Vice-president Illinois Steel Co., Chicago. Abstract of address delivered before the Iron and Steel Institute at Glasgow, Scotland, Sept. 21.

Illinois Steel Co.—South Works
(Tons Produced Per Man-Hour)

	1902	1926	Increased Percentage
Ore unloading	2.087	16.835	706.7
Blast furnaces	0.185	0.698	277.3
Bessemer ingots	0.421	0.841	99.8
All open-hearth ingots	0.252	0.418	66.0
Rail mill—South Works 1902 } Gary Works 1926 }	0.189	0.416	120.1

This table shows that the average man in a modern iron and steel plant is producing from one and a half to eight times as much as he did 25 years ago. If translated into yearly volume, these figures indicate that at South Chicago the average workman has increased his ore handling capacity since 1902 from 6000 to 48,000 tons; his pig iron output from 675 to 2405 tons; his Bessemer ingot production from 1761 to 3730 tons; his open-hearth ingot production from 1049 to 1842 tons, and his rolling capacity from 603 to 1240 tons of rails.

That this accomplishment is fairly typical of the changes that have taken place in like branches of the industry, for the country as a whole, is supported by data lately published by the United States Department of Labor, which shows an average increase in worker productivity upon a man-hour basis of 165 per cent from 1899 to 1926 for crude iron and steel products.

These results are impressive when it is recalled that they are based upon actual continuous records running over a quarter of a century in a plant which in 1901 represented the latest development in equipment, organization and method, and one that during the intervening years has kept abreast of current change.

Such a transformation is essentially due to the enlargement of units, refinement of design and the installation of labor-conserving appliances rather than to fundamental changes in process. Behind these, however, is the large addition of mechanical energy by which these improvements have been made possible, and back of all lies enormous investment and cooperation of men and management.

Productivity Expanded by Use of Mechanical Power

The manufacturing productivity of any nation can be roughly measured by the amount of its mechanical energy, and the marked growth of power application in the United States has made possible its expansion and prosperity. From 1899 to 1925 the country's primary horsepower more than trebled, and as a result of this increase there is now 4.25 hp. at the service of every manufacturing wage earner.

On the conventional assumption that 1 hp. is equal to the unassisted physical effort of 10 men, the average capacity of the individual worker in the United States is more than 40 times what it would be if unaided by mechanical energy.

The manufacture of iron and steel has more than kept step in power installation with the progress made in general industry. During the last 25 years its use of power has increased nearly fourfold, and to each of its workmen there is now given the energy of over 16 hp.

The extent to which power usage has been amplified and the electrification of plant increased, is strikingly exemplified by the Gary works of the Illinois Steel Co. A short generation ago the reciprocating steam engine was the principal prime mover in both primary and secondary units. At Gary the production and utilization of power are dependent upon the blast furnace gas engine, steam turbine, electric generator and motor. Here 11,716 men were able in 1926 to turn out more than 2,500,000 tons of finished product because back of each of them was the electrical energy of nearly 20 hp.

Wages Have Increased More Than Commodity Prices

It is but natural to ask whether or not the increase in worker productivity in which power usage is such an important factor has been followed by an increase in "real wages." Wages and earnings in the Chicago district may be considered as typical of those existing elsewhere in the iron and steel industry of the country. In 1901 the daily wage was based on 15c. per hour and the average yearly earnings of all employees of the South Chicago works for that year was \$825. By 1926 the hourly rate had risen to 44c. and the average yearly earnings to \$1,870, an increase of 127 per cent, or more

than double the amount of earnings received before. With this increase in earnings went also a reduction of nearly 18 per cent in the hours the men were required to work. Prior to 1922 the iron and steel industry had been operated almost universally on the basis of 12 hr. for continuous operations and 10 hr. for non-continuous operations. In that year the present 8 and 10-hr. day working schedule was adopted, and several years earlier the seven-day week had been replaced by the six-day week.

In the first decade of the century there was no striking change in the basic cost of living or in the wage scales. By 1914, however, there had become pronounced that vicious circle of high commodity prices, high cost of living and high wages which a few years before had begun to evidence itself. War conditions aggravated the situation and commodities, living costs and wages rapidly pursued one another upward in an ever expanding sequence until the deflation of 1921. The social and economic consequences to the wage earner and to industry are told by the following result of Governmental investigation. Earnings in 23 representative industries increased 115 per cent between 1914 and 1925. Living costs of workers' families rose 68 per cent and the hours of labor decreased more than 6 per cent.

These figures indicate that wages in manufacturing industry have more than kept pace with the increase in commodity prices. The surplus earning power thus represented well explains the present wide consumption of luxuries and the high standard of living that now exists.

The Investor Has Not Fared So Well

Granting that the economic change during the last 25 years has been distinctly beneficial to the wage earner, what has been the contemporaneous effect upon the consuming public and investor?

If we take the price relation that existed between the composite steel price and the wholesale price of commodities in 1913 as a base, we find that whereas in 1901 the price of steel was relatively 52 per cent higher than that of commodities, it was in 1926 3 per cent lower. The composite price of steel is now practically 27 per cent higher than in 1901 while the wholesale price of commodities has increased 99 per cent.

Due to efficient management, the spending of many millions in power and machinery, and the cooperation of labor, the consumer, relatively speaking, is buying steel now cheaper than he did 25 years ago.

With the investor of today it is somewhat of a different story, and this is especially true if there be borne in mind the difference in the amount of money represented by capitalization upon which dividends are paid, and the much larger sum that is represented by the balance sheet, and upon which earnings are dependable.

While there are from the Government no exact figures of the amount of money that is now invested in the iron and steel industry, the published balance sheets of steel companies representing over 85 per cent of the country's ingot capacity show a capitalization of approximately four and one-half billion dollars. According to these reports earnings for the years 1925 and 1926 are respectively 5.61 per cent and 6.70 per cent on the capital invested. It thus appears that, while the wage earner, the consumer and the public in general have been very distinctly benefited, capital has not fared so well.

Inefficient Equipment Scrapped to Reduce Cost

Due to the exigencies and stimulation of the war, the ingot capacity of the United States increased slightly over 15,000,000 tons for the six years of 1915 to 1920 inclusive, or at the rate of approximately 2,500,000 tons per year.

The end of the war left the country with excess plant development, and for six years subsequent to 1920 the total ingot capacity increased less than 3,500,000 tons, or at the approximate rate of 500,000 tons per year. The theoretical steel ingot capacity of the nation is today, in round numbers, 58,000,000 tons. While during the war no expense was spared to enlarge the country's steel capacity, investment during the last six years has been made with special reference to the reduction of costs, diversification of product,

and the betterment of quality, instead of increased production.

This explains why the installation of power and labor-saving machinery has been of late so strongly emphasized and why there has been such heavy scrapping of inefficient and obsolete machinery and plant. Irrespective of its physical condition or its length of service it is not good business to continue to use machinery if a better design will pay a fair return on its investment by reducing cost. The American practice is drastic in this regard, and it is only by such a progressive policy that any concern or any nation can hope to keep abreast of the times and successfully maintain its position.

Management and the Human Side of Industry

Management early in the century began to recognize more practically its obligations to the human side of industry. It found that the minimization of occupational hazard, sanitary surroundings, hospitals, better housing and other welfare work which promoted the health and happiness of the worker and his family, not only was humane but paid by the good will and the co-operative spirit that it inculcated. In the development and application of this new science of human engineering the iron and steel industry, inspired by the example of the United States Steel Corporation, has taken a most prominent part.

In 1906 the United States Steel Corporation inaugurated a campaign of safety, sanitation and welfare which has ever since been vigorously pursued. Tonnage and costs became no longer the sine qua non of achievement, and the safety and welfare of the worker is a vital consideration in mill operations.

Accident prevention has naturally been most prominently stressed. The safeguarding of machinery starts with the drafting board in all construction and is diligently pursued thereafter as experience permits. Education and organization of men into safety committees plays an important part, and that expense is not allowed to interfere with the desired object is indicated by the expenditure by the United States Steel Corporation last year of \$1,750,000 in safety work.

Sharp Reduction in Accident Rate

As a result of such intensified effort extraordinary reduction in the accident rate has been achieved. Among the quarter of a million men employed by the United States Steel Corporation in 1926, the rate of disabling accidents was 3.26 per cent as compared with 20.57 per cent in 1912, or a reduction of 84.15 per cent of the former rate. That means that in the company 365,277 men have been saved from disabling injuries since 1912 as measured by the sum of the reduction in accidents each year.

In addition to the payment of liberal wages various corporations seek to improve the financial condition of their employees by affording them the privilege of stock subscription on advantageous terms. In the United States Steel Corporation, in illustration, there were 47,647 employees registered as stockholders as of Dec. 31, 1925, who held 665,801 shares of the corporation's preferred and common stock, with an aggregate value of over one hundred millions of dollars. Like the corporation's safety and other welfare activities, this method of encouraging a partnership relation is absolutely divorced from any paternalistic method or condi-

tion, to which both men and management rightfully object.

Large Increase in Per Capita Steel Consumption

At the beginning of the century the United States with a population of 76,000,000 people produced 9,500,000 tons of finished steel, while in 1926 with a population of 117,000,000 this output had risen to 35,500,000 tons. In other words, each inhabitant as an average used 739 lb. of finished steel in 1926 as compared with 279 lb. in 1900, or over two and one-half times as much now as formerly. This expansion is essentially due to increased domestic demand and has been little influenced by the small percentage of growth in the country's foreign trade. The following statistics show how small this change has been. The iron and steel imports and exports of the United States, in round numbers, were respectively 200,000 tons and 1,000,000 tons in 1900, as compared with imports of 1,000,000 tons and exports of 2,000,000 tons in 1926.

The increasing ramifications of steel's new uses are continually making for widening markets. At the beginning of the century the production of rails absorbed 25 per cent of the country's entire steel output. Last year, although the rail tonnage was half again as large as it was 25 years ago, it represented only 9 per cent of the country's steel production.

In the new demand for steel the most important development is the expansion of the automotive industry, which last year took 15 per cent of the nation's output.

Prosperity Based on Thriving Public, Contented Labor and Adequate Earnings

The economic progress or retrogression of any nation depends upon the expansion or curtailment of the individual production of its workers, and the secret of America's well being lies in its unrivaled per capita output.

Back of all accomplishment, however, is human effort, and the installation of power and the wealth of material resources will be but abortive aids unless utilized and directed by the hand of able and willing labor.

The character of any people depends upon their education and environment, and their material welfare can be assured only if founded upon sound economic methods. The irrevocable law of supply and demand is nothing but human nature reduced to a formula, and composite human nature is unchangeable in its primary instincts in spite of civilization's veneer.

Consumption is vitally affected by costs of production, but for management to lower costs by reducing wages if they are reasonable is just as shortsighted as for labor to try to improve its condition by restricting its output. Both, if continued, must inevitably lead to lower standards of living.

Prosperity to continue must be based upon a thriving public, contented labor and adequately remunerated capital. If any one of this essential trinity becomes unbalanced the wheels of industry will slow down and prosperity disappear.

As a prophet may not be without honor, save in his own country, I venture the prediction that, as war has given way to peace, so will ignorance give way to economic enlightenment, and that in the new spirit of industrial cooperation there will be found both greater prosperity and a better understanding between the nations of the earth.

Over \$1,000,000 Wasted Annually by Mail Advertisers

Under the heading here given, Postmaster Kiely, of New York, has issued a bulletin from which the following has been taken:

"The direct-mail advertisers of the United States in the year 1926 wasted, literally threw away, over \$600,000 through the use of obsolete mailing lists combined with the failure of the advertisers to use return cards on their envelopes. These figures, however, include only advertisers who mailed their circulars under first class postage. A very much larger amount was lost by advertisers who used third class postage. This,

however, cannot be estimated, since a separate record is not kept of undeliverable third class matter disposed of as waste by postmasters.

"The records of the Post Office Department show that during the year, 12,688,567 letters containing circulars and advertising matter, all mailed as first class matter, were disposed of as waste by the dead letter service. Figured at 5c. each to cover the cost of material, printing, labor and postage, the total amounts to \$633,428.35. This advertising matter furnished over 50 per cent of all the dead letters handled in the year."



Washing 7000 Sheet Metal Parts a Day

Handling Equipment Features Installation in Automobile
Works—Water Recirculated After
Skimming Off Grease

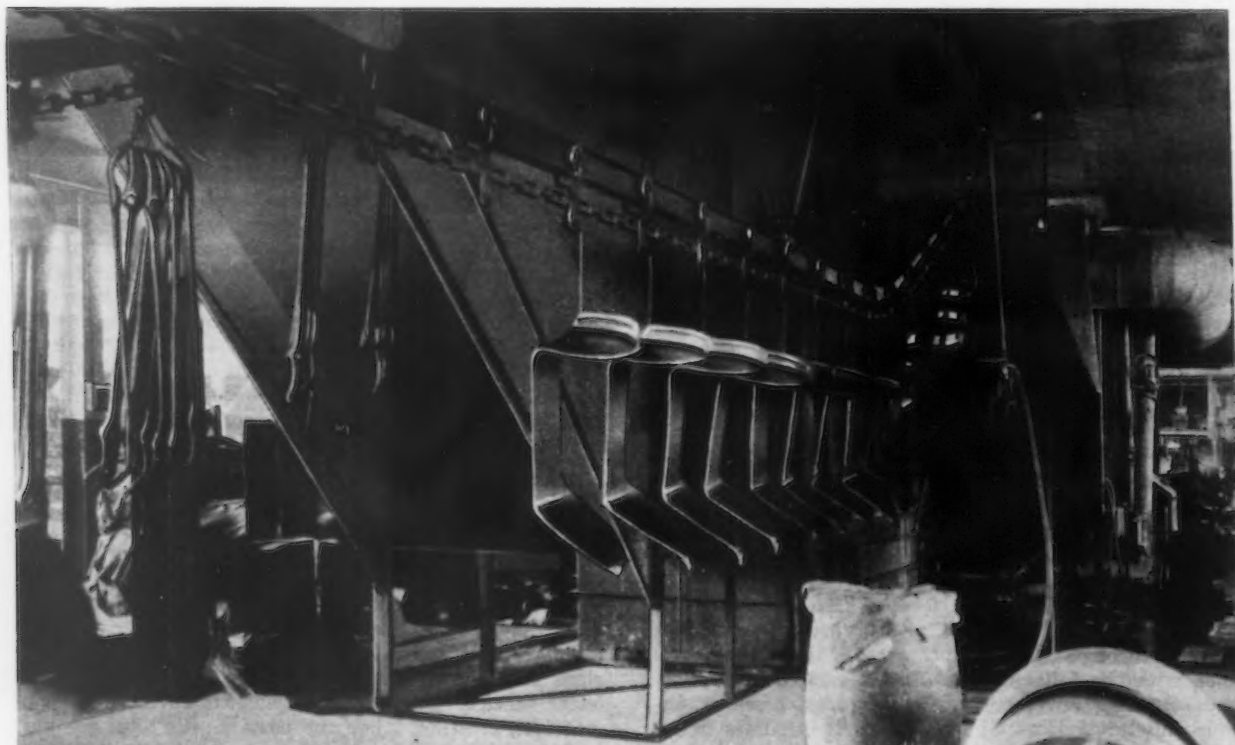
A METAL-WASHING machine having a capacity for washing parts for 800 to 1000 automobiles a day is included in the equipment installed to aid rapid production in the new "Pontiac Six" plant of the Oakland Motor Car Co., Pontiac, Mich. This is believed to be the largest machine ever built for this class of work. It was built by the Detroit Sheet Metal Works, Detroit.

The machine is designed to wash and rinse various parts in preparation for enameling after they leave the manufacturing departments. These pieces include the four fenders, two running board aprons, the radiator splash shield and certain forgings and castings. The work is hung on a monorail chain-pull conveyor and travels over 100 ft. in moving from the entrance to the exit of the machine, whence the same conveyor carries

it to a drying oven. The conveyor is operated at variable speeds, traveling at about 25 ft. a minute for a production of about 1000 cars a day.

In the machine are three high-pressure washing zones. The work is first washed with a washing compound and then is given two clear rinse water sprays. In each cleaning zone 1200 gal. of water is used a minute. This water is recirculated continuously by means of double-suction centrifugal pumps, and is kept clean by an arrangement of grease-skimming baffles and screens.

A partition extends through the center of the machine. The work passes down one side, loops around and returns to the end from which it started. The clear space provided for the work is about 7 ft. high and 4 ft. wide.



Exit End of the Machine, Showing Splash Shields Coming Out at Right and Radius Rods Entering at Left

Oil, Gas and Electric-Fired Furnaces

Advantages and Disadvantages of Each Type Analyzed for Specific Operations—Control and Atmosphere Stressed

BY F. W. MANKER

AS a general proposition the ideal furnace is one which will produce a perfect product at the lowest overall cost. Because each problem in furnace applications involves many variables it is not possible to set up specific solutions. It is possible only to establish general principles which may be applied to specific problems. Every ideal furnace must represent such a combination of design elements and fuel that:

- 1.—The smallest initial investment is required,
- 2.—The greatest output per dollar of investment is secured,
- 3.—The labor for operation is a minimum,
- 4.—The quality of product is uniformly maximum.

Popular conception of furnace design would place automatic control as the first essential of the ideal furnace. The effect of this control is to reduce labor, increase the percentage of perfect product and assure uniformity of product. It is well established that gas and electricity, both controlled through the same instrument are practically foolproof in operation. Both fuels possess a form value which readily lends itself to automatic control. On the other hand, oil has such characteristics that it demands eternal vigilance, a high quality of fuel and a skillful original design to produce comparable results.

Engineering ability must be called upon to produce the majority of the other elements of the ideal furnace. It is reasonable to expect a design to be developed for an electric furnace or for a gas furnace that will produce any conditions of automatic continuous operation or temperature cycles, provided the engineering ability is put into the design. Disregarding the factor of influence of atmosphere on the product, it is reasonable to assume that equal engineering ability can produce, with gas or electric fuels, equally satisfactory furnaces from the standpoint of operation or product. A comparison between the two types of furnaces will then generally resolve itself into a comparison of actual heating costs.

Gas vs. Electricity

This matter of heating costs, while in favor of gas if the furnace efficiency is disregarded, may result in a final cost considering the furnace efficiency, in favor of electricity. The difference in furnace efficiencies between a gas fired furnace and an electric fired furnace is represented by the amount of heat lost through the products of combustion escaping from the working chamber of the furnace. This statement is based upon the premise that the fuel-fired furnace has such combustion equipment that, independent of the operator, the scientifically correct proportions of fuel and air will always pass through the burners of the furnace, and that the maximum energy of the fuel will be liberated, without excess air or deficiency of air and without fuel loss due to improper intimacy of fuel air mixture in the furnace.

To meet these conditions it is necessary that the gas-air mixture be independent of the operator, and be

homogeneously mixed as a matter of design characteristic of the burner, so that it enters the furnace combustion chamber as a perfect explosive mixture. Under these conditions the maximum heat will be liberated. The form value of gas makes possible this premise. In the case of oil such a premise is not possible.

The difference in efficiency of the electric furnace and the gas furnace doing the same work, built with the same wall thicknesses, having the same door openings and the same cycle of operation, will be represented by the amount of heat carried away from the furnace in the waste products of combustion.

Electric Furnace Advantage at High Temperatures

If the waste products of combustion leave at room temperature, then the efficiencies of the gas furnace and the electric furnace are identical. As the waste products of combustion rise above room temperature, the efficiency of the gas furnace drops below that of the electric furnace. For this reason the obvious application for electric furnaces, to secure the maximum advantage over fuel-fired furnaces, is in the range of extremely high temperatures.

Operating costs should therefore be more comparable where the electric furnace is used in melting steel than where it is used in a low-temperature drawing operation. The production of electric furnace steel for castings and the use of the electric furnace for producing alloy steels is a conspicuous example of this application. In this example, however, the form value of the fuel is of great benefit in controlling the quality of the product, so that the electric furnace is not only high in efficiency compared with other furnaces but gives a valuable control over the product. Another example of the form value of electricity plus efficiency and high temperatures is in the melting of copper alloys, where it has had wide application.

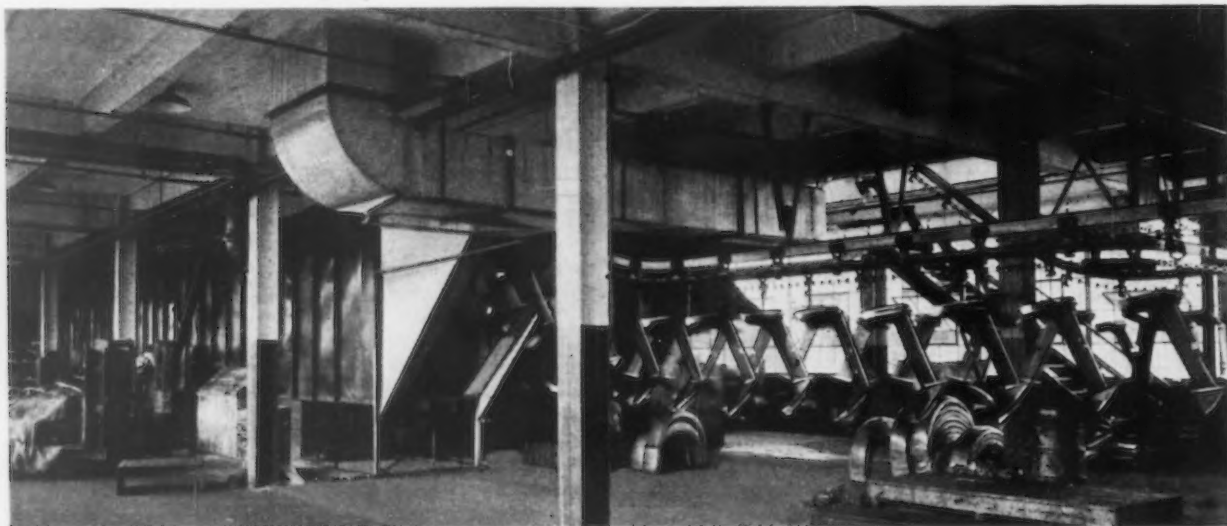
Influence of Furnace Atmosphere

As electricity has no waste products of combustion, an erroneous conception has arisen regarding the influence of electric heat on the surface of the work. When the work is charged into an electric furnace it is charged into normal atmosphere of the room, which contains 20 per cent free oxygen. It is not possible to operate the furnace without free oxygen unless special means are provided for eliminating it. Therefore the characteristic of every electric furnace is inherently highly oxidizing. In contrast, the gas fired furnace products of combustion may contain free oxygen or no free oxygen and an excess carbon monoxide, which is reducing, depending upon the characteristics of the work to be treated in the furnace. The use of special means to prevent decarburization is the only way electricity can be used to fire certain furnaces for heat treating operations.

Normalizing Conditions

In the production of steel which is satisfactory for deep drawing, as fenders for automobiles, the mill has been forced to go to a type of heat treatment known as normalizing. This normalizing operation takes the place of the first box anneal, the former practice.

This is a portion of a paper read at a dinner April 18 of the Detroit chapter of the American Society for Steel Treating, in the General Motors Building of that city. The author is Vice-president Surface Combustion Co., 366 Gerard Avenue, The Bronx, New York.



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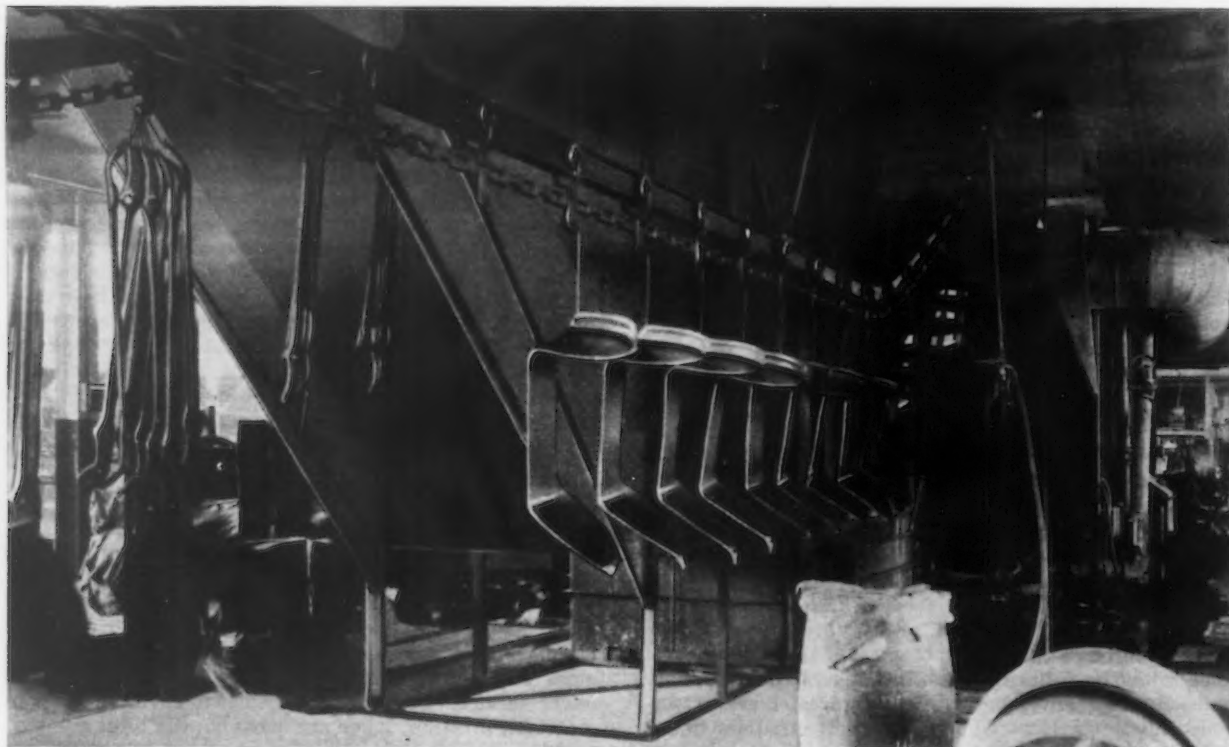
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Normalizing is really a special appeal given the individual sheet in the open furnace. In this process the temperature gradient in the furnace must be definitely set. The sheet in passing through the furnace must pass through a reducing atmosphere and be handled in such manner that it does not scale, stretch or pit.

It is interesting to note that the first furnace built for this normalizing operation was fired with oil. We do not know of a single oil-fired furnace in operation today for producing a deep-drawing full-finished automobile sheet.

A large independent sheet manufacturer installed an electric furnace for normalizing. This furnace was operated for only a few weeks. Now this manufacturer has three coke-oven gas-fired normalizing furnaces. This is a conspicuous example of the influence of atmosphere on surface quality of product. Gas alone is able to meet the requirements.

This normalizing operation should not be confused with annealing of strip steel, because there is a decided temperature difference at which the anneal takes place. Therefore, although we know of one installation where strip steel is annealed with electric heat, the same furnace would be unsatisfactory at the normalizing operation, which is maintained at a temperature at least 800 deg. higher than the strip annealing operation.

Cost Elements Considered

Where the product is not affected by the atmosphere in which it is heated, the choice of oil, electricity or gas develops along the line of the value of the furnace design which has been produced for each of these fuels, as a factor in reflecting the bare cost per unit of heat input. As an example, we may consider carbonizing, where production conditions permit the use of continuous furnaces, almost entirely a question of relative fuel costs and furnace efficiencies. The best operation records we have for each of these fuels are as follows:

Oil	180 lb. per gal.
Electricity	14 lb. per kw-hr.
Gas	1.17 cu. ft. per lb.

Application of these fuel quantities times the cost of each fuel will give a close answer for any particular installation. It must be kept in mind that the entire fuel requirements of the plant must be in harmony, to cover the overall situation correctly.

Development of furnace design for this operation is such that any user can go into the market and buy a furnace which will give equally uniform temperature distribution, quality of production, rate of heating or other factors desired to compare, except perhaps that of maintenance, by considering only the fuel cost and furnace thermal efficiency.

Fuel Consumption in Steel Industry

In the steel industry we have the greatest of all users of furnaces and fuels. For every ton of steel produced, on the average two tons of coal or its equivalent is used in connection with the manufacture and heat treatment before it reaches the state of finished product. This means approximately 100,000,000 tons of coal or its equivalent was used in the steel industry for this purpose last year. Of this total volume about 40,000,000 tons represented coke and the remainder coal in the form of gas.

The trend in the manufacture of steel is evident. Firing of raw coal for heating operations is rapidly being eliminated. Blast furnace gas and coke oven gas are being used for open-hearth and reheating operations. One of the latest developments is to mix blast furnace and coke oven gas, to secure a mixed gas having a heating value of about 300 B.t.u. per cu. ft. Such a gas may be used in reheating operations such as soaking pits, continuous furnaces for slabs, blooms and billets or any other lower temperature operation. The advantage of this mixed gas is to make possible the use of the coke oven gas on operations having temperatures around 2000 deg.

Hot producer gas or oil was formerly in general usage for open-hearth melting. The trend is to displace hot producer gas and oil with straight coke oven gas.

Control of Soaking Pit Heating

Soaking pits are generally fired with hot producer gas, but the efficiencies represented are extremely low. An attempt was made to introduce electricity in a pit in Buffalo some two years ago, under rather unfavorable conditions. So far as the installation is concerned it was possible to show satisfactory heating results with electricity. The reduction of scale loss amounted to one-half per cent, equivalent to at last 25c. per ton saving for common steel and a great deal more for alloy steel, plus a saving of 25 per cent in the power required for rolling.

It is interesting to note that the mill appreciated for the first time the value of controlled heat for soaking pits. Subsequently an installation of a special type soaking pit was made, using coke oven gas, firing behind a muffle wall of refractory material, to produce an indirect heated or radiant heated soaking pit. The results obtained duplicated the electric installation. The present construction of soaking pits has remained unchanged for many years and the inefficiencies and lack of control existing with present construction will undoubtedly lead to radical changes in soaking pits in the near future.

Re-Heating Furnaces

Billet heating furnaces of the side-door type, which were common a few years ago, have almost disappeared in favor of the end discharge, end charge, pusher-type furnace fired with gas. Wherever possible the installations are being made on by-product gas; if this is not available hot producer gas is used. Oil is used only occasionally for this operation. The general trend of design appears to be toward the use of metal recuperators in connection with this type of furnace, plus firing equipment which will automatically produce complete combustion without over or under ventilation. There is a tendency in steel mill operations in general to go direct from the ingot to a semi-finished product. In some mills this eliminates the billet re-heating furnaces.

From the semi-finished products, reheating operations are used for the fabrication of the finished product. Plants making the finished product in most instances do not have the benefit of by-product coke oven installations. Their fuel situation is therefore different from that of the steel-making plants. Structural steel, steel rails and sometimes plates are produced at the mills. Steel sheets, strip steel, reinforcing shapes, steel wire and tubes are in most instances produced in plants which must provide a supply of fuel, independent of open-hearth or blast furnace requirements.

Sheet Steel Conditions

Manufacture of sheet steel has developed a technique in furnaces and a tradition with regard to fuel usage entirely its own. The sheet steel manufacturer usually buys his raw material in the form of sheet bars. General practice in the past has been to build sheet and pair furnaces as a combination unit. The material is heated first in the form of bars in the pair furnace and afterward in the form of partly finished sheets in the sheet furnace.

In ordinary operation the bars are heated once and the partly finished sheets are reheated several times, depending on the process of rolling. The same kind of furnace is used for all classes of sheets, whether tin plate or automobile or galvanizing or plain black sheets.

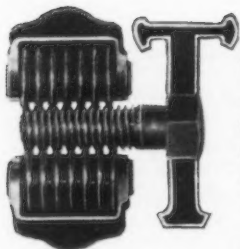
These furnaces were formerly fired by hand, with coal. The sheet and pair furnaces were of the in-and-

(Continued on page 844)

How to Specify Screw Threads

Also Some Considerations in Connection With Design of Gages—Use of Recommended Standard Thread Sizes Important

BY C. W. BETTCHER*



THE nomenclature adopted in the report† of the National Screw Thread Commission differs somewhat from the terms broadly used in the past, and tolerances are also expressed in a manner different from that customarily seen on blueprints.

After setting forth a few fundamental definitions, the following article presents typical examples, to show how the new tolerances and other recommendations of the commission work out in practice.

Definitions

<i>Screw Thread Commission</i>	<i>Past Practice</i>
Major Diameter (D)	Outside Diameter (O.D.)
Minor Diameter (K)	Root Diameter (R.D.)
Pitch Diameter (E)	Pitch Diameter (P.D.)

Pitch.—The distance from a point on a screw thread to a corresponding point on the next thread measured parallel to axis. Pitch in inches equals 1 divided by the number of threads per inch.

Lead.—The distance a screw thread advances axially in one turn. On a single thread screw the lead and the pitch are the same; on a double thread the lead is twice the pitch and on a triple thread the lead is three times the pitch, etc.

Angle of Thread.—The angle included between the sides of the thread measured in an axial plane.

Helix Angle.—The angle made by the helix of the thread at the pitch diameter with a plane perpendicular to the axis.

Allowance.—An intentional difference in dimensions of mating parts. It is the minimum clearance and represents the condition of the tightest permissible fit. For example, between the largest screw and the smallest nut.

Tolerance.—The amount of total variation permitted in the size of a part.

Basic Size.—The theoretical or nominal standard size from which all variations are made.

Fit.—The relation between two mating parts with reference to the conditions of assembly. Classes of fits are defined as follows:

- Class 1, loose fit—Includes screw-thread work of rough commercial quality, where the threads must assemble readily, and a considerable amount of shake or play is not objectionable.
- Class 2, free fit—Includes the great bulk of screw-thread work of ordinary quality, of finished and semi-finished bolts and nuts, machine screws, etc.
- Class 3, medium fit—Includes the better grade of interchangeable screw-thread work.
- Class 4, close fit—Includes screw-thread work requiring a fine snug fit, somewhat closer than the medium fit. In this class of fit selective assembly of parts may be necessary.

A screw thread has the following elements: 1, Major (outside) diameter; 2, pitch diameter; 3, minor (root) diameter; 4, angle of the thread; and 5, lead.

Of these the least important are the outside diameter

and the root diameter because contact between the nut and the screw is not wanted at the tops and bottoms of the thread. Hence the tolerances for the outside diameter are large and are specified as so much below basic for the screw and above basic for the nut, and the tolerances for the root diameter are specified as so much above basic.

Tolerances Worked Out on Basis of Pitch Diameter

Proper contact between the screw and nut is determined by accuracy of lead, thread angle, and pitch diameter. It is very inconvenient to measure these elements separately, but with the use of suitable "go" and "not go" thread gages representing the pitch diameter limits, the lead and angle errors cannot exceed certain amounts. For this reason the Screw Thread Commission's tolerances are worked out on the basis of pitch diameter tolerances only, and the amount of pitch diameter tolerance governs the permissible lead and angle errors for a certain class of fit. As a guide to manufacturers the Commission's tables of tolerances give the lead errors and angle errors which will each take up half of the pitch diameter tolerances specified.

It works out in practice as follows: A screw to be satisfactory must go into a "go" gage that has been made to the maximum pitch diameter specified and correct lead and angle and yet the pitch diameter of the screw, as measured by a thread micrometer, must not be below the reading indicated by the P. D. tolerance allowed. In other words, if the screw is slightly off on lead, it could only be made to fit the "go" gage by reducing the pitch diameter. The limits given in the Commission's tables show how much the pitch diameter may be reduced in order to make the screw pass the "not go" gage.

There is a definite relation between the amount of change in pitch diameter that is necessary to compensate for lead error. In the case of the U. S. or National thread form, it is necessary to reduce the pitch diameter 0.0017 in. for every 0.001 in. error in lead in the length of engagement. Take the case of a screw $\frac{1}{2}$ in. in diameter, fitting a ring gage $\frac{1}{2}$ in. thick: If the screw has a lead error of 0.002 in. in 1 in., it would have a lead error of 0.001 in. in the $\frac{1}{2}$ in. length of engagement and the pitch diameter would have to be reduced 0.0017 in. in order to compensate for this lead error and permit the screw to enter the gage. The pitch diameter tolerances given in the Commission's report, therefore, show how much reduction in pitch diameter is allowable in order to fit gages, and this tolerance thus governs the amount of lead error permissible without the necessity of measuring the lead.

Let us take the typical example of an order for a quantity of $\frac{1}{4}$ in. diameter, 20 threads per inch U. S. (National) screws. Suppose that this is ordered as "Class 2, Free Fit." Such a screw would have the following basic or theoretical dimensions: Outside diameter, 0.250 in.; pitch diameter, 0.2175 in.; root diameter, 0.185 in.; single depth of thread, 0.0325 in.

By referring to page 45 of the Commission's report, for Coarse Threads, under the Column $\frac{1}{4}$ -in.-20, it will be noted that the outside diameter of the screw may vary from 0.250 in. as a maximum to 0.2428 in. as a minimum, or a tolerance of 0.0072 in. minus. At first glance, this tolerance would seem to be large, but as stated above, the outside diameter of the screw is not an important element of the screw within certain limits

*Secretary and Sales Manager of the Eastern Machine Screw Corporation, New Haven, Conn.

†Miscellaneous publications No. 61 of the Bureau of Standards.

because contact between the outside diameter of the screw and the nut is not desirable.

Tolerance on the Pitch Diameter

We will now consider what is the tolerance on the pitch diameter. We find in this same table that the pitch diameter has to be held for Class 2, Free Fit, between 0.2175 in., which is the theoretical pitch diameter for $\frac{1}{4}$ in.-20 thread, and 0.2139 in. or a tolerance in pitch diameter of only 0.0036 in. minus. Without gages this tolerance in pitch diameter would be very simple to hold as it would be principally a matter of adjusting the die head to size. When we consider, however, that this screw must fit a "go" gage, and yet the pitch diameter must not be reduced by more than the pitch diameter tolerance allowed, it will be noticed that this is a relatively close tolerance and means that the lead must be held accurate to a thousandth of an inch ($\frac{1}{2}$ of 0.0036 in. divided by 1.7) for the thickness of the gage used. If the gage is $\frac{1}{4}$ in. thick, the maximum lead error in 1 in. would be 0.004 in.

On the other hand, if the thread had been a $\frac{1}{2}$ in.-20 thread instead of $\frac{1}{4}$ in.-20, the gage would be probably $\frac{1}{2}$ in. thick and as pitch diameter tolerance depends on pitch and would be the same as in the case of $\frac{1}{4}$ in.-20 thread, we would now find that the lead would have to be held accurate to not over 0.001 in. for the $\frac{1}{2}$ in. thickness of gage or 0.002 in. in 1 in.

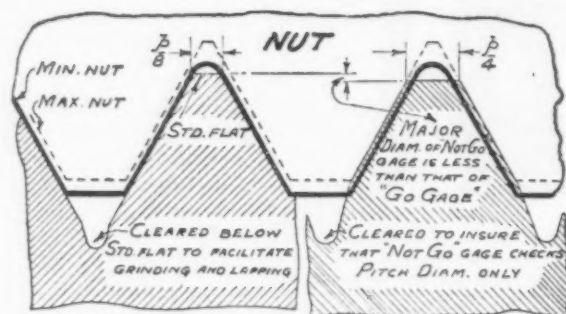
Let us now see what the limits would be in the case of $\frac{1}{4}$ in.-20 and $\frac{1}{2}$ in.-20 threads in Class 3, medium fit. We find that the outside diameter tolerance is the same in Class 3 and also in Class 4 by the way, as in Class 2. On the pitch diameter, however, we find that Class 3 must run between 0.2175 in., the theoretical, and 0.2149 in., or a tolerance of 0.0026 in. instead of 0.0036 in. as in the case of Class 2. Half of this pitch diameter tolerance (0.0013 in.) is to take care of lead error. Dividing this by 1.7 we find that the lead must be accurate to 0.0008 in. in the length of the gage or length of engagement. If the gage is $\frac{1}{4}$ in. thick this means that the lead must be accurate in a $\frac{1}{4}$ in.-20 thread to 0.0032 in. in one inch. If the thread were a $\frac{1}{2}$ in.-20 thread, the gage would probably be $\frac{1}{2}$ in. thick so that the lead error would have to be kept within 0.0016 in. in 1 in.

Summarizing, the Commission's report provides in each class of fit, a pitch diameter tolerance, depending upon the pitch or number of threads per inch. This

pitch diameter tolerance automatically limits the lead error in the length of engagement. If, however, the gage is thin or tapped hole is shallow, it naturally permits a larger lead error per inch and likewise if the gage is thick or tapped hole deep, it naturally reduces the amount of lead error permitted per inch.

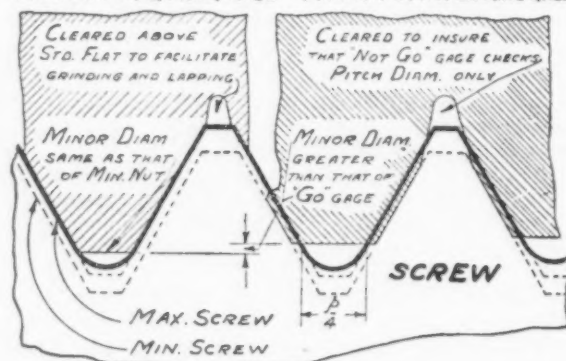
R. D. of Female Gage Must Be Larger than Theoretical R. D. of Screw

An important thing to consider in the manufacture of thread gages or in the purchase of thread gages is to specify that the root diameter of the female gage must be larger than the theoretical root diameter of the screw. In the Commission's report, recommendations for the design of gages always make the ring gages correspond to the minimum minor diameter of the nut, which is larger by 0.008 to 0.015 in. (depending



MINIMUM OR "GO" PLUG GAGE MAXIMUM OR "NOT GO" PLUG GAGE

MAXIMUM OR "GO" RING GAGE MINIMUM OR "NOT GO" RING GAGE



Thread Form of "Go" and "Not Go" Thread Plug and Ring Gages. NOTE—"Not Go" gages check pitch diameter only.—From the Report of the National Screw Thread Commission

THREAD SIZES RECOMMENDED

The following thread sizes are recommended by the Division of Simplified Practice, Department of Commerce, the National Screw Thread Commission, appointed by Congress, the American Engineering Standards Committee and other engineering bodies. Form of threads is National (U. S.)

Diameter	Pitch			
	National Coarse	National Fine	Lighting Fixtures	Railroad
No. 5	40	..	..	..
No. 6	32	..	..	..
No. 8	32	36	..	..
No. 10	24	32	..	..
No. 12	24	28	..	..
$\frac{1}{16}$ in.	20	28	27	..
$\frac{3}{32}$ in.	18	24	27	..
$\frac{1}{8}$ in.	16	24	27	..
$\frac{9}{32}$ in.	14	20	27	..
$\frac{1}{2}$ in.	13	20	27	12
$\frac{5}{8}$ in.	12	18	27	12
$\frac{3}{4}$ in.	11	18	27	12
$\frac{7}{8}$ in.	..	..	..	12
1 in.	10	16	27	12
$1\frac{1}{8}$ in.	..	14(18)*	27	12
$1\frac{1}{4}$ in.	9	14(18)*	27	12
$1\frac{3}{8}$ in.	8	14	27	12
$1\frac{1}{2}$ in.	7	12	..	12
$1\frac{3}{4}$ in.	7	12	..	12
2 in.	6	12	..	12
$2\frac{1}{2}$ in.	5	12	..	12
3 in.	4 1/2	..	..	12

*Spark plug bushing, $\frac{1}{8}$ in.—24.

†Spark plug shell, $\frac{1}{4}$ in.—18.

NATIONAL STANDARD PIPE THREAD (AMERICAN BRIGGS) TAPER AND STRAIGHT (Form of Thread, Modified V)

Pipe Size	Threads per In.	Pipe Size	Threads per In.
$\frac{1}{8}$	27	$\frac{3}{4}$	14
$\frac{1}{4}$	18	1	11 1/2
$\frac{3}{8}$	18	$1\frac{1}{4}$	11 1/2
$\frac{1}{2}$	14	$1\frac{1}{2}$	11 1/2

on pitch) than the theoretical root diameter, so as to make sure there is no interference or bind at the root diameter of the thread.

Gages that have a root diameter equal to the theoretical root diameter impose an inspection hardship on the manufacturer of the screws. Root diameter is not important in assembly since the tap drill size used is always larger than the theoretical root diameter.

In the design of new equipment, machinery, tools and other devices requiring threaded parts, too much emphasis cannot be laid on the importance of making the selection from the tables provided below. Inasmuch as practically all threaded parts are manufactured for assembly, the degree of interchangeability or the accuracy of assembly, depends upon the specifications to which they are manufactured. By selecting standard thread sizes, suitable tools of proper accuracy are immediately available and likewise suitable gages and suitable specifications are easily provided so that there should be no difficulty in getting the class of fit required. On the other hand, if the designer selects a thread size that is different from standard, special taps and special dies have to be made up and they cannot be made to as great a degree of accuracy as is the case with standard stockable sizes. At the same time there will not be gages available or specifications for these special sizes. The expense of making threaded parts in special sizes mounts up very rapidly, to say nothing of the annoying delays that special work of this nature always entails.

Bottle Test for Sand Control

Crane Co. Keeps Foundry Losses Down by Close Watch
on Sand—Has Only Three Kinds: Standard,
Coarse, and One With High Bond

SAND control, that ever-present problem of the foundryman's, was discussed in shop terms by Eugene W. Smith, general foundry superintendent of the Crane Co., Chicago, at the meeting of the Ohio State Foundrymen's Association, Aug. 19. He pointed out that while laboratories have developed accurate methods for the analytical testing of sands and many ingenious devices for making physical tests, the foundry still has its scrap pile, and to a certain extent there is antagonism between the laboratory and the foundry.

The foundryman has acquired his knowledge by practical experience and has been forced by circumstances to accept certain rules and methods which have been handed down by predecessors. These may have become obsolete, but it would be hard for research men to convince the practical man that they are obsolete. The speaker wished to do all he could to bring about a closer touch between the research men and the foundrymen, not only to correct such a state of affairs but also to bring the laboratory studies closer to the actual problems encountered, so the real cause of each detrimental effect may be defined and eliminated.

Grain Size Principal Thing to Watch

The proper selection of sand is the first requirement for successful production of iron castings. This selection must be based upon its fitness for the foundry's particular line of work. If the sand is not suitable, there is no device that will make it so. Certain important points to be borne in mind in this connection were emphasized by Mr. Smith.

The grain size in the molding sand and the grain size of the core sand should be approximately the same, or the finish of the castings will vary in proportion to the difference. The standard strength or bond in the sand should be selected primarily to make castings of the same "metal" thickness without the presence of core-sand.

When excessive core droppings weaken the sand, a sand with stronger bond but of the same nature as the standard molding sand and of the same grain size should be added to the heaps in sufficient quantity to overcome the weakening effect of the added core sands. Likewise, in molding heavier castings which are out of line with the regular run, it becomes necessary to open up or vent the sand by the use of a heavier grained sand to increase its permeability.

Thus it is only necessary to have a standard sand and two control sands, one for bonding purposes, the other for venting purposes, to enable a foundryman to overcome every possible form of loss (assuming that his equipment and metal are up to standard conditions).

A foundryman who has sanely used standard grades of sand for years will sometimes purchase some high priced material to help him keep down losses from some unknown cause. This he introduces in small amounts and tightens up on general supervision, and there is an immediate reduction in losses. He does not realize that with the same care, attention and treatment of the regular material would have given him the same good results at a much lower cost.

The first requirement is a prompt and accurate daily record of all scrap castings, whether in the foundry or assorting room. This record should be itemized and separated into three general sources of loss—metal, equipment, or sand.

The first item, metal, is the most popular foundry alibi but too frequently misused—if the metal is hot

and fluid there is nothing further required from a casting standpoint. Slaggy castings, pin-holes, cold shut, misrun castings from hot and fluid metal are due to some mistreatment of the metal and not to the metal itself. For instance a boiling mold will cause slaggy castings. Sand cutting on flow of the metal will cause slag in castings. The greater part of so-called "blowed" castings are caused by the lack of openness in the sand, preventing the escape of gases within the mold, or to a short sprue, having insufficient ferrostatic pressure to force the gases through the sand. The same tight sand condition will cause misrun or cold-shut castings. Since the gases are unable to escape, they resist the flow of the metal.

Assuming that the metal and equipment conditions are right, the first thing to investigate is the amount of moisture in the sand, for proper tempering of sand should result in reduced losses from sand causes and the almost entire elimination of sponges, swabs, vent-wires, gaggers, soldiers, nails, skimming rods, and risers from consideration.

The speaker noted the following requirements applying particularly to continuous sand tempering:

An even distribution of the sand to the tempering devices; equalized moisture control; control of new sand introduction; proper and thorough mixing; correct cooling and soaking "time" aerating or revivifying the sand; uniform distribution of sand to molders; facing sand control; testing and control of the "bond" content; venting the sand in preference to venting devices.

Such considerations inevitably lead to the method of sand control.

Successful control of sand cannot be attained without the daily use of some form of test. A variety of testing apparatus is offered, any of which, if used properly, would mean an immediate reduction of casting losses, in the speaker's opinion, due primarily to the fact that attention is then given to the condition of the sand as well as to the psychological effect upon those responsible.

Bottle and Vibrator Test Recommended

Mr. Smith emphasized the value of the simple bottle and vibrator test for foundry sand. He said that he based all his opinions and all the changes he made in the control of sand in his own plant upon results given by the bottle and vibrator test plus close observation of the scrap, especially as influenced by changes in the sand. He declared that he had found the test bottle absolutely dependable and that when properly examined it will give the foundryman everything necessary for sand control.

There are many seemingly unimportant conditions in the foundry which, due to improper practices affecting the sand, have a very decided effect on the product. For example, a sand which by test is proved strong enough, permeable or open enough and of standard fineness required for the product after frequent use becomes filled with fine, gravel-like particles which go through the riddle. It is surprising how much of this material together with shot iron may be carried by the natural bond in the sand.

Another bad condition results from the constant use of seacoal. An unconsumed portion of the coal is left in the sand each day and as it accumulates weakens the sand. The consumed portion of the coal leaves an ash which stays between the grains, has no binding quality, and is a frequent source of "rat-tails" and leaky castings. This is one of the most frequent causes

of difficulties which affect light castings requiring plating or polishing.

Both the above described conditions can be detected by the vibratory test.

Watch Facing Sand

Facing sand is seldom given proper consideration in the foundry, because its importance in producing good castings is not fully realized. Its proportion is usually in the hands of the lowest order of help and the only requirement appears to be that the casting may shine or clean easily in the tumbling mill. The mixture once established is continued year in and year out and is seldom given much further thought.

Sand from which the facing is made should be in the

best condition before using. Mr. Smith pointed out that shovel or barrow measurements can never give uniform mixtures. The proportion of new sand or seacoal should be accurately calculated and weighed or measured to suit the class of work to be done. Facing sand should be made more open than heap sand by adding a small proportion of new sand with heavier grain for venting. The amount to be added should be about 2½ per cent for medium weight castings and 5 per cent for heavier castings.

Facing sand well tempered and open will greatly assist in reducing losses by slag, scab, blow, misrun and cold shut castings. Occasional testing of facing sands by the vibratory method is also an invaluable help to the foundryman.

Values in By-Product Tar

Plants Operating Large By-Product Coke Oven Installations Can Profitably Extract Creosote Before Burning Residue

BY JOHN MORRIS WEISS*

COAL TAR disposal in the steel industry has engendered considerable discussion as to the economic course to pursue. Three avenues are open:

1. Use of the tar as fuel.
2. Sale to independent tar producers.
3. Distillation by the producer.

Until recently the steel companies owning by-product coke ovens and producing coal tar adopted either the first or second course, with the fuel use predominant. Within the last two years one such steel plant has installed tar distilling apparatus which is now operating and another has committed itself to the policy, although the detailed plans as to plant size and products to be produced are not yet public.

The arguments in favor of tar burning—which indeed seems to be an economic waste—have had some basis of right. The tar fuel is available in the plant and therefore not subject to transportation difficulties and interruption of supplies. It is materially lower in sulphur content than the average available petroleum fuel oils and it is said to give a flame of characteristics especially suited to efficient operation of the open-hearth furnace. Above all, however, the price at which the tar could be sold to independent tar distillers was such that there was little or no financial advantage in so doing. The convenience of the tar for fuel was worth more than a fraction of a cent per gallon, which might be the net increase in value realized through the sale. When, however, the possibility that the producer may distill his own tar is considered, the financial comparison is very different. It is no longer a question of fractional pennies but of nickels or dimes per gallon, which when translated into dollars per year makes a very attractive picture.

How Conditions Have Changed

In the early days of coal tar production, before the time of the by-product coke oven, the tar made in any one plant was relatively small in amount. Hence, the independent tar distiller came into existence, purchasing tar from several sources, and thereby obtaining sufficient tonnage to warrant an economic operation. Furthermore, the quality of tars produced in the old style horizontal gas retorts varied more than do the tars from by-product coke ovens of today. There was a certain advantage to be gained by blending extreme tars to obtain a medium tar of the desired commercial characteristics.

Tar distillers therefore grew up around the main centers of tar production, since the raw material is not a product which can bear a high freight rate. Today the industry is almost entirely in the hands of

companies who are not tar producers themselves. The two largest tar distillers have, however, affiliated interests which control the production of a portion of the crude tar handled. Control of the tar, either in this way or by long term contract, is a necessity to the independent distiller—the prime essential in the tar business is a steady uninterrupted supply over an extended period. Without this the erection of any plant is economically unjustified.

For this very reason many iron and steel companies are in an excellent position to enter the field of tar distillation. There is, of course, a minimum amount of tar which would justify a plant installation, and this minimum seems to lie around 500,000 gal. per month. Of course the greater the production the more favorable the situation. Then, also, special conditions of location, quality of the tar, location of markets and the like may combine to set the minimum profitable tonnage either somewhat above or below the figure stated.

Marketing the Product

The operation may be a very simple one, involving merely the production of creosote oil, used for wood preservation, and hard pitch, which latter may be used for fuel or returned to the coke ovens in mixture with coal. This makes a very easy marketing proposition as the only product to sell is the creosote oil. The creosote oil market is unsaturated, as about half the country's present requirements are imported and only the supply limits the use of creosote at the present time. Such a simple course would give a net on today's market of about 8c. per gal. of average tar—all operating expenses being deducted. At such times as an active briquette pitch market exists, simple diversion of the pitch to this field might raise the net return per gallon to over 10c. With especially favorable local market conditions, even this last figure might be increased.

Over an extended period the extra profit obtained by working tar rather than burning or selling it should be at least 2c. per gal. and probably nearer 4c. per gal. This works out in round figures from 20 to 50c. per ton of steel produced by a well integrated operation, which is by no means an inconsiderable item. A coke oven plant producing 500,000 gal. of tar per month should be able to place an additional \$120,000 per year on the right side of the ledger by a proper distilling operation.

There are many iron and steel plants having this or greater opportunities in distilling the tar from their coking operations, and in the present highly competitive state of the industry such extra credits cannot be overlooked.

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Unusual Car Dumper Installation

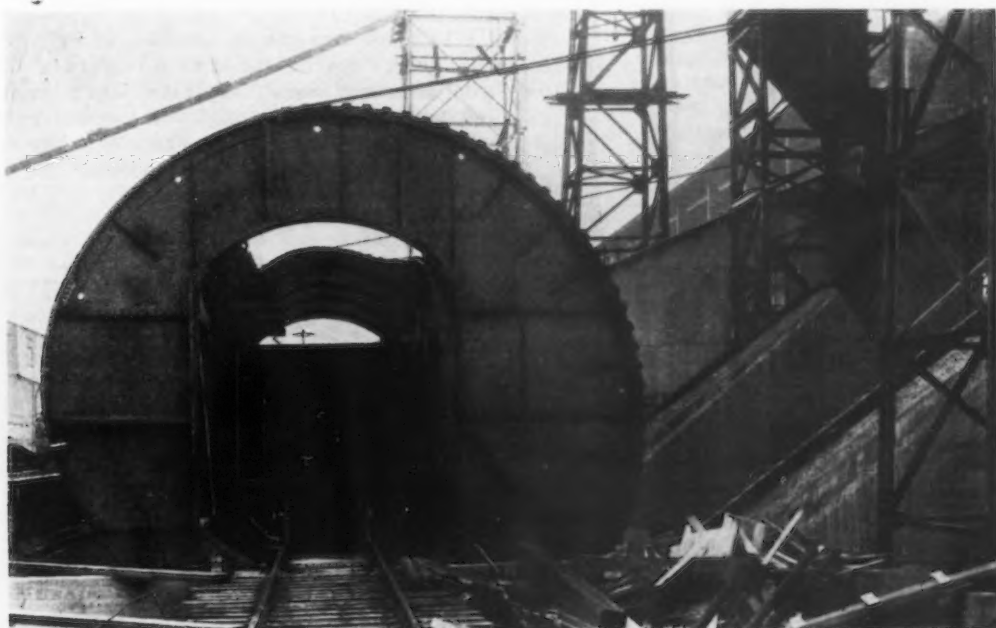
Machine Rolls Up Slope, Carrying Car to Elevation and
Avoiding Need for Sunken Bin

TO handle cement rock from railroad cars to the storage yard at the crusher plant of the Florida Portland Cement Co., Tampa, a car dumper has been installed having a number of unique features. It was built by Wellman-Seaver-Morgan Co., Cleveland.

Conditions surrounding this installation required an equipment which would unload the cars without providing the usual storage bins under the dumper. The general level of the ground is only a few feet above water level, and it was desired to provide storage for a day's use at the crusher plant without rehandling. By rolling the dumper up an incline the bin was not necessary, and sufficient storage was provided to meet the requirements.

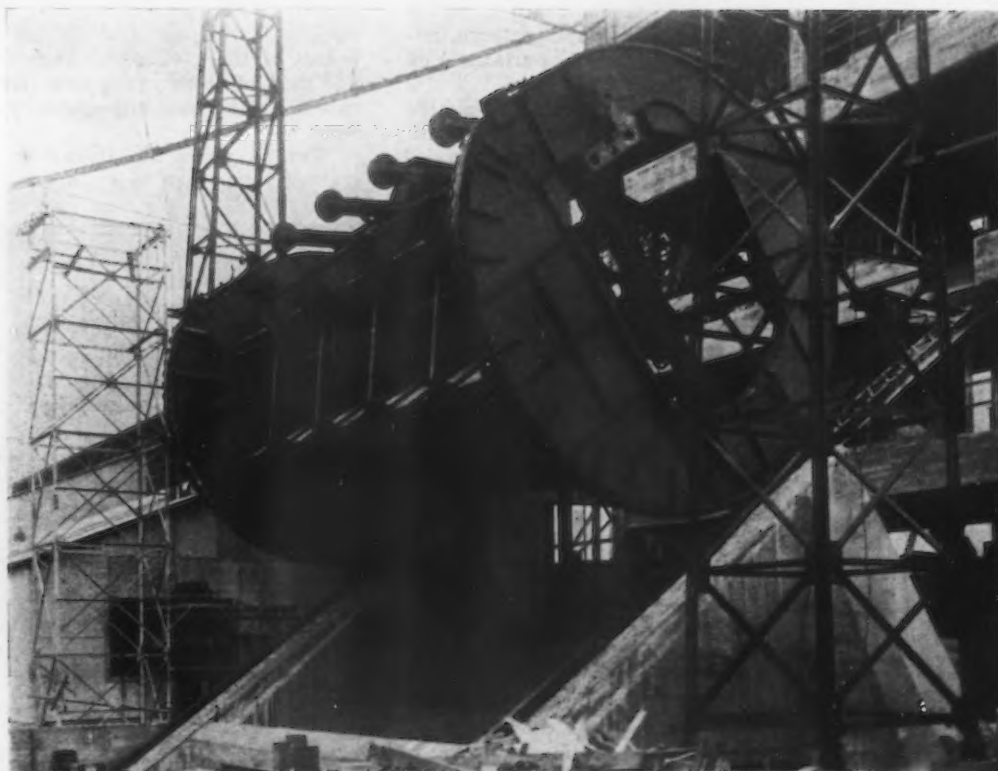
While similar in many respects to the Wellman revolving car dumper, this dumper, instead of being "revolved" upon equalizing rollers carried in structural steel bases secured to the foundation, is "rolled" into its dumping position upon steel girder runways inclined at approximately 35 deg.

Machinery for "rolling" the dumper up the incline is mounted on foundations at the ground level, under the crusher tower. It consists of two drums spaced 50 ft. center to center, each drum being driven by a double reduction of cut gearing. The second intermediate shaft extends the full distance between the drums, being geared at the center to the driving motor. It is provided with a manually operated brake used



***E**ND View of the Car Dumper with a Car in Place and the Clamps About to Descend to Hold it Tightly. This shows the sharpness of the incline (at right) up which the whole structure is rolled in the process of dumping the car*

Rolling Up the Incline, the Machine Dumps the Contents of its Car at an Elevation Considerably Above the Track, and thus Avoids Need for a Bin Sunk into the Marshy Ground on Which the Plant Is Located



only in emergency, the service brake being electrically operated and attached directly to the motor.

The platen is supported on forged steel flat tread rollers, which run on flat plate paths riveted to the cross frame of the tippie. The car clamps are of the pivoted counterweight type, four clamps being provided for holding the cars in position during the dumping and return cycle. Each clamp has its own independent operating mechanism and, as all the clamp mechanism is carried at the rear side of the dumper, there is unobstructed dumping except for the narrow clamp beams themselves.

When the dumper is in position for the start of the dumping cycle, the counterweight rollers rest upon the inclined guides and the chain is nearly unwound from the chain wheel. The clamp counterweight ropes are nearly unwound from the holding rope drum and the lifting rope is wound upon the clamp lifting drum. As the dumper begins to rotate in the dumping direction, the counterweight rollers will move up the inclined guides, which will slacken the chain and allow the clamp lifting ropes to pay off the lifting drum. The slides and beams will then lower, due to their weight, until they rest upon the top of the car.

During this part of the operation the clamp counterweight or holding ropes are wound in the same amount as the lifting ropes are unwound. When the slides and beams rest upon the top of the car, rotation of the drum ceases. After the counterweight has left the inclined guides, the counterweight arm hangs vertical until the pawl is thrown into engagement, which occurs after the cradle has rotated about 45 deg. During the rest of the dumping cycle the counterweights act as a fixed arm in reference to the drum

center, but the actual, or gravity, arm constantly increases until the car is dumped.

This arrangement produces the greatest holding force upon the car at that part of the cycle when the car and its contents have the greatest tendency to leave the platen.

The pawl is brought into engagement with the ratchet wheel on the holding drum by means of a roller. The pawl has an extension with the roller at its end. When the dumper has revolved about 45 deg., this roller strikes a cam pivotally fastened to the dumper frame and forces the pawl to engage the ratchet on the holding drum and compress the pawl holding-out spring.

After the contents of the car have been discharged, reverse rotation of the dumper will reverse all operations, and the slide and beam will be raised to their original position by the pull of the chain caused by the counterweights rolling down the inclined guides. This will revolve the chain wheel in the proper direction to wind up the lifting ropes.

This dumper is driven by one 115-hp. motor provided with a full torque magnetic brake, and a controller of the magnetic switch type. The machine is fitted with a geared limit switch, to slow down and stop the rolling of the dumper in either direction.

Open-top railroad cars can be handled, at the rate of 20 cars an hour, from 7 ft. to 12 ft. 6 in. high; 9 ft. to 10 ft. 6 in. wide and overall lengths of 50 ft. inside of cars, and having a loaded weight of car and contents of 220,000 lb., i. e., cars with 80 tons capacity of rock, plus approximately 10 per cent overload and a tare weight of 45,000 lb.

Brown & Sharpe Have Trained Apprentices for 94 Years

Young Men Are Taught the Trades of Machinist, Draftsman, Patternmaker, Molder, Coremaker and Blacksmith—135 Enrolled

THE Brown & Sharpe Mfg. Co., Providence, R. I., maintains one of the oldest and largest apprentice schools in the country. Training is given to young men in the trades of machinist, draftsman, patternmaker, molder, coremaker and blacksmith. There is also a special course in automatic screw machine operating.

Besides the regular training in the production shops, each apprentice is given a thorough course in mathematics and mechanical drawing during shop time in a building set aside for classroom use. For senior boys there is a six months' course in foremanship in which studies are made in such subjects as handling men, importance of production, overhead, transportation of work, etc.

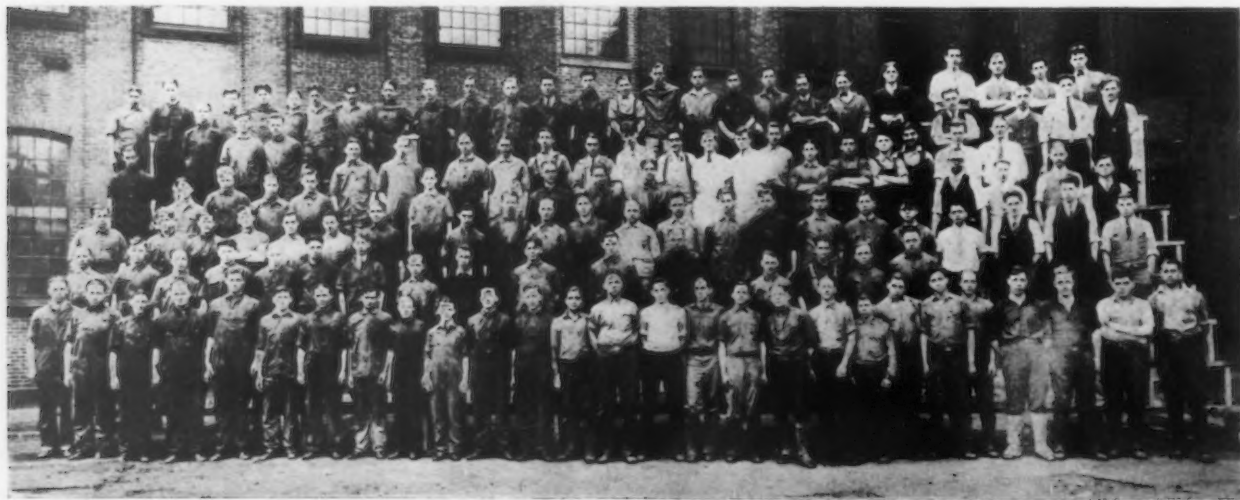
In addition to the regular classwork in mathematics and drawing, there are illustrated lectures by practical men on subjects such as cutting oils, grinding wheels, hardening, testing materials, etc. These lectures, as

in the case of all classwork, are given on company time and the apprentices are paid at their regularly hourly rates.

In each course a schedule of operations is carried out by means of charts kept by the apprentice department office. Boys do not shift for themselves. Instead, they are moved from one department to another with as much regularity as would be found in a high school or college program.

There are 135 apprentices now taking the various Brown & Sharpe courses and 47 of them come from outside Providence and its surrounding towns. The homes of these 47 boys range from Illinois to Maine and most of these young men live at a dormitory maintained by the company exclusively for use by apprentices.

For 94 years the Brown & Sharpe Mfg. Co. has trained young men in its shops.



One Hundred and Thirty-five Apprentices Are Now Enrolled in the Classes of the Brown & Sharpe Mfg. Co., Providence, R. I.

New Light on Iron-Silicon Alloys

Preliminary Report Covering Research on Attempts to Render Such Alloys as Duriron Less Brittle

BY M. G. CORSON*

IRON-SILICON alloys are important in two respects—their technical usefulness on the one hand and their mysterious properties on the other.

Effect of Various Percentages of Silicon

In the region up to 1.5 per cent Si lie the structural steels. Here a unit of silicon brings about a considerably larger increase in strength and yield point than obtainable with any other generally used additional element.

From 3.5 to 4.5 per cent Si one finds himself in the domain of transformer sheet irons. In some not previously understood manner, this amount of silicon decreases enormously the hysteresis losses in strong magnetic induction fields. Alloys of this composition are not very ductile; they retain, however, the ability to be cold rolled. Sometimes the product shows a distinct lamination, but this is only of advantage to the builder of transformers.

Next, above 5 per cent silicon the plasticity drops suddenly and the alloys become brittle. Nothing above 5 per cent Si has been considered suitable so far for either forging or rolling.

Somewhere above 11 per cent Si, the alloys start to show (in their cast condition) a continuous increase in corrosion resistance. The latter develops rapidly until a composition of 14.5 per cent Si is reached. Here it remains almost stationary up to 17 per cent Si. Beyond this point, it decreases again.

Structural silicon steels are of the same order of corrodibility with soft iron. Transformer iron and alloys up to 11 per cent corrode much more than plain iron; alloys with 9 to 10 per cent silicon being practically the worst of the series.

The Corrosion Resistant Alloy

This resistance to corrosion renders the alloys with 13 to 17 per cent silicon highly important for the chemical industry. Castings made of alloys in this range,

*Consulting metallurgist, 8108 Polk Avenue, Jackson Heights, New York.

contaminated with sulphur, phosphorus and manganese to a total of 0.5 to 1 per cent and purposely containing from 0.5 to 1.2 per cent of carbon, form the least expensive material for the construction of such parts of chemical apparatus as come into contact for a long time with sulphuric, nitric, all organic acids and to some extent even hydrochloric acid. Duriron, Tantiron, Corrosiron, Thermisilid, Elianite, etc., are the trade names under which these alloys are known in the United States and in Europe.

Still their most important drawback is their brittleness. True enough certain companies in this field have developed methods by which castings of an excellent, smooth surface and possessing fair strength can be obtained as a rule. Such castings require practically no machining at all. If need be, they can be ground on emery wheels and belts with the utmost ease and perfection; the more so, the higher the carbon. On the other hand, these castings have to be carefully protected from shocks and there is not the slightest possibility of their being machined or forged.

Brittleness of These Alloys Discussed

This brittleness constitutes a real puzzle for anyone who is interested in the relationship between the properties of alloys and their constitution. There have been made up to this time at least six investigations of the equilibrium diagram of the iron-silicon series, all by accepted authorities on the subject. The results differed in some respects beyond the point of 16 per cent Si. Up to this composition, however, they are in close agreement.

It has been found that up to 16 per cent all alloys are nothing else than a solid solution of silicon in iron. In other words, the atoms of silicon enter, in one manner of distribution or another, into the crystalline lattice of each grain of iron and a piece of an alloy within this range may not be built up of anything but crystals of an identical type. In addition, the presence of silicon has been found to work in the direction of the total elimination of the gamma phase

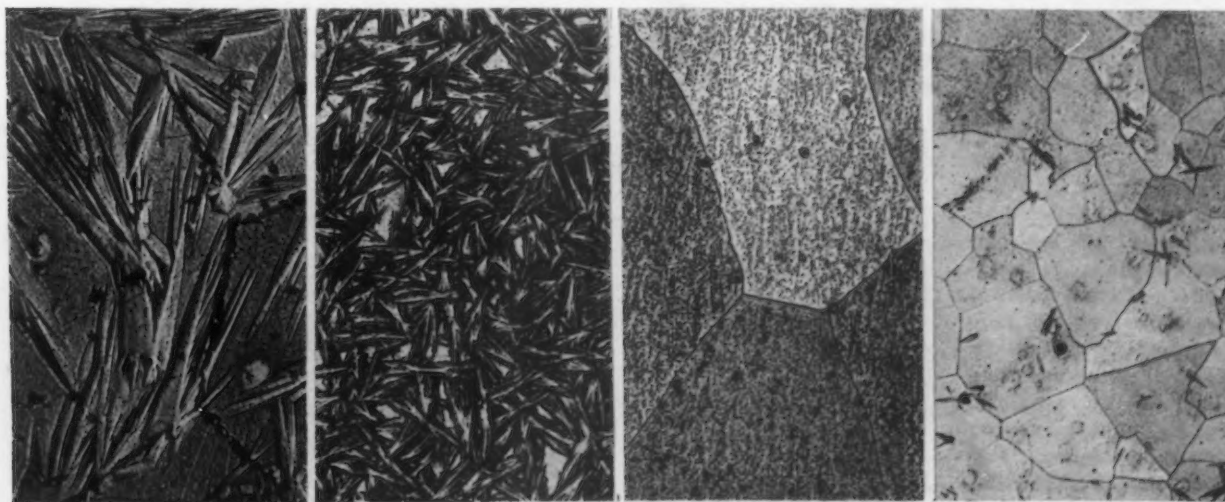


FIG. 1

FIG. 2

FIG. 3

FIG. 4

Figs. 1 to 4 show microstructures of an 8 per cent silicon-iron alloy in four different states—martensitic, spheroidized and nearly homogenized. Photomicrographs slightly reduced from an original of 500 diameters for Fig. 1 and 100 diameters for Figs. 2, 3 and 4

only in emergency, the service brake being electrically operated and attached directly to the motor.

The platen is supported on forged steel flat tread rollers, which run on flat plate paths riveted to the cross frame of the tippie. The car clamps are of the pivoted counterweight type, four clamps being provided for holding the cars in position during the dumping and return cycle. Each clamp has its own independent operating mechanism and, as all the clamp mechanism is carried at the rear side of the dumper, there is unobstructed dumping except for the narrow clamp beams themselves.

When the dumper is in position for the start of the dumping cycle, the counterweight rollers rest upon the inclined guides and the chain is nearly unwound from the chain wheel. The clamp counterweight ropes are nearly unwound from the holding rope drum and the lifting rope is wound upon the clamp lifting drum. As the dumper begins to rotate in the dumping direction, the counterweight rollers will move up the inclined guides, which will slacken the chain and allow the clamp lifting ropes to pay off the lifting drum. The slides and beams will then lower, due to their weight, until they rest upon the top of the car.

During this part of the operation the clamp counterweight or holding ropes are wound in the same amount as the lifting ropes are unwound. When the slides and beams rest upon the top of the car, rotation of the drum ceases. After the counterweight has left the inclined guides, the counterweight arm hangs vertical until the pawl is thrown into engagement, which occurs after the cradle has rotated about 45 deg. During the rest of the dumping cycle the counterweights act as a fixed arm in reference to the drum

center, but the actual, or gravity, arm constantly increases until the car is dumped.

This arrangement produces the greatest holding force upon the car at that part of the cycle when the car and its contents have the greatest tendency to leave the platen.

The pawl is brought into engagement with the ratchet wheel on the holding drum by means of a roller. The pawl has an extension with the roller at its end. When the dumper has revolved about 45 deg., this roller strikes a cam pivotally fastened to the dumper frame and forces the pawl to engage the ratchet on the holding drum and compress the pawl holding-out spring.

After the contents of the car have been discharged, reverse rotation of the dumper will reverse all operations, and the slide and beam will be raised to their original position by the pull of the chain caused by the counterweights rolling down the inclined guides. This will revolve the chain wheel in the proper direction to wind up the lifting ropes.

This dumper is driven by one 115-hp. motor provided with a full torque magnetic brake, and a controller of the magnetic switch type. The machine is fitted with a geared limit switch, to slow down and stop the rolling of the dumper in either direction.

Open-top railroad cars can be handled, at the rate of 20 cars an hour, from 7 ft. to 12 ft. 6 in. high; 9 ft. to 10 ft. 6 in. wide and overall lengths of 50 ft. inside of cars, and having a loaded weight of car and contents of 220,000 lb., i. e., cars with 80 tons capacity of rock, plus approximately 10 per cent overload and a tare weight of 45,000 lb.

Brown & Sharpe Have Trained Apprentices for 94 Years

Young Men Are Taught the Trades of Machinist, Draftsman, Patternmaker, Molder, Coremaker and Blacksmith—135 Enrolled

THE Brown & Sharpe Mfg. Co., Providence, R. I., maintains one of the oldest and largest apprentice schools in the country. Training is given to young men in the trades of machinist, draftsman, patternmaker, molder, coremaker and blacksmith. There is also a special course in automatic screw machine operating.

Besides the regular training in the production shops, each apprentice is given a thorough course in mathematics and mechanical drawing during shop time in a building set aside for classroom use. For senior boys there is a six months' course in foremanship in which studies are made in such subjects as handling men, importance of production, overhead, transportation of work, etc.

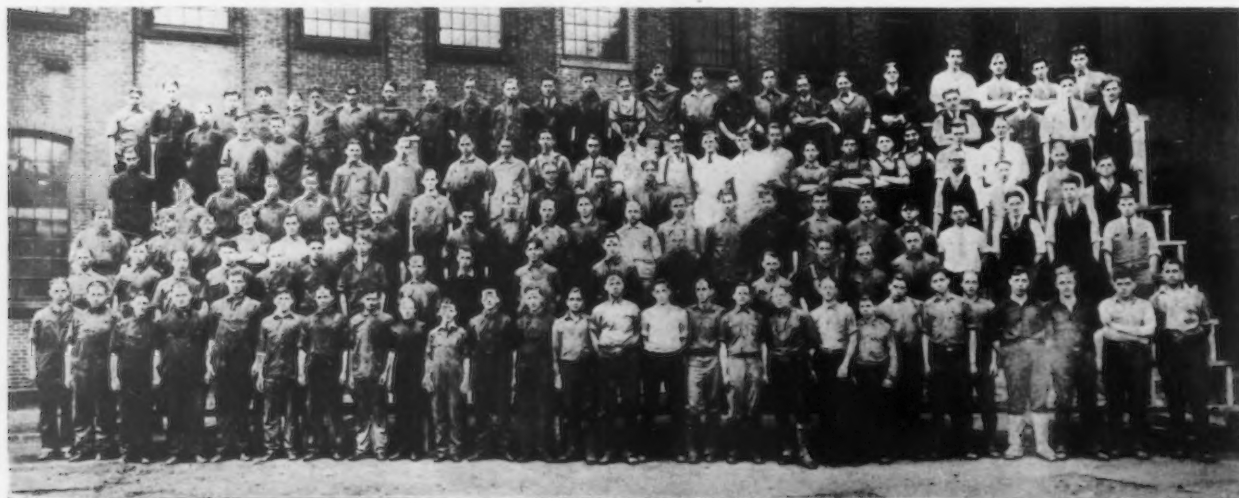
In addition to the regular classwork in mathematics and drawing, there are illustrated lectures by practical men on subjects such as cutting oils, grinding wheels, hardening, testing materials, etc. These lectures, as

in the case of all classwork, are given on company time and the apprentices are paid at their regularly hourly rates.

In each course a schedule of operations is carried out by means of charts kept by the apprentice department office. Boys do not shift for themselves. Instead, they are moved from one department to another with as much regularity as would be found in a high school or college program.

There are 135 apprentices now taking the various Brown & Sharpe courses and 47 of them come from outside Providence and its surrounding towns. The homes of these 47 boys range from Illinois to Maine and most of these young men live at a dormitory maintained by the company exclusively for use by apprentices.

For 94 years the Brown & Sharpe Mfg. Co. has trained young men in its shops.



One Hundred and Thirty-five Apprentices Are Now Enrolled in the Classes of the Brown & Sharpe Mfg. Co., Providence, R. I.

New Light on Iron-Silicon Alloys

Preliminary Report Covering Research on Attempts to Render Such Alloys as Duriron Less Brittle

BY M. G. CORSON*

IRON-SILICON alloys are important in two respects—their technical usefulness on the one hand and their mysterious properties on the other.

Effect of Various Percentages of Silicon

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FIG. 1



FIG. 2



FIG. 3

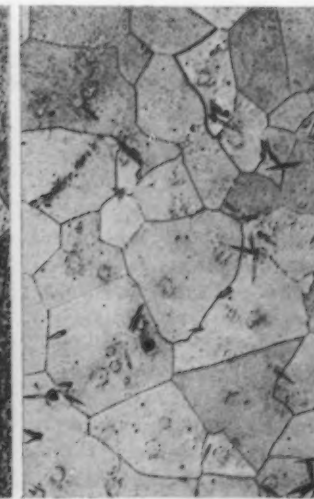


FIG. 4

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(austenitic iron) and consequently of the transformations—delta to gamma and gamma to alpha (on cooling).

In the newest diagrams one finds, therefore, an absolute absence of the gamma phase above 3 per cent silicon, and consequently all alloys up to 16 per cent silicon are considered as crystallizing in the body-centered cubic lattice of the delta iron and as retaining it with no transformations whatsoever until at low temperatures we call them alpha solid solutions. Alpha phase is identical with the delta phase.

Now it is a matter of universal experience that, as long as a ductile or malleable metal takes in another

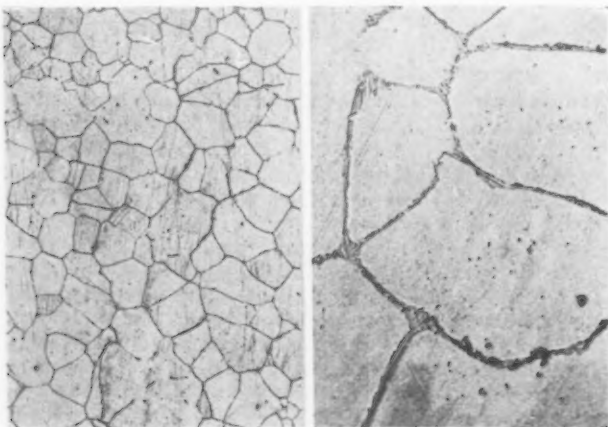


FIG. 5

FIG. 6

Figs. 5 and 6.—Structure of an alloy containing 15 per cent silicon and located accordingly somewhat beyond the Fe_3Si composition. At X 100 (Fig. 5) it seems to be homogeneous; at X 500 it shows the secondary constituent FeSi at the grain boundaries. All slightly reduced from the originals

element to form a solid solution, the product remains plastic up to the saturation limit and even somewhat beyond it. Even pearlitic steel is ductile, though it carries as much as 14 per cent of iron carbide as the secondary phase. A tin bronze, with 16 per cent tin, will usually show large patches of the hard eutectoid (bronzite) and still it possesses considerable plasticity. Aluminum, alloyed with 10 per cent copper, is far beyond the saturation limit of the solid solution and still can be hot rolled and even, to an extent, cold rolled. In the light of these facts the sudden brittleness of iron-silicon alloys beyond 5 per cent silicon is indeed a rather weird fact.

This feature of the Fe-Si alloys has puzzled the author for a long time. To what might this brittleness be due? Logical metallography offers only two answers: Either a certain contamination takes place beyond 5 per cent silicon and goes on increasingly, or our ideas about the constitution of alloys up to 16 per cent silicon are all wrong.

The same question has been of decided interest to P. Schenck, president of the Duriron Co., Dayton, Ohio, from the industrial viewpoint. Whether due to contamination or to a constitutional feature, as soon as the cause of the brittleness should become known,

there might be found a way to eliminate it. Having met on this common ground, Mr. Schenck and the author decided to undertake research work in this direction which the Duriron company backed with a generous appropriation. Considerable assistance has also been given to the author by the Union Carbide & Carbon Research Laboratories and the author owes his thanks to its vice-president, J. H. Critchett. J. R. Vilella, the company's metallographer, developed an exceedingly effective method of etching that helped enormously in the investigation.

Conclusions Based on the Author's Research

The research just accomplished by the author consisted in making a series of alloys up to 25 per cent silicon and studying in detail various physical features and micro-structures. Its results cannot be given here in detail due to lack of space, so the author is obliged to confine himself to a few brief statements. They are based on extensive experiments which will be fully presented later in a paper before one of the technical societies. The conclusions are as follows:

The brittleness of high-silicon alloys is not due to contaminations. They are immune to nitrogen and to a considerable extent to oxygen as well.

The constitutional features in the range of 4 to 15 per cent Si are much more complicated than it had been supposed by previous investigators. Every alloy up to 14.4 per cent, or slightly below, has to pass through two transitional processes, since there is a wide region both as to temperature and composition where austenitic (gamma) iron persists in the presence of the body-centered high-silicon phase. This region stretches from approximately 2.5 per cent Si to 12.5 per cent at least. Its lower boundary runs nearly parallel to the abscissa at the altitude of the A_3 point.

This can be illustrated by photomicrographs, Figs. 1 to 4, which represent an 8 per cent silicon alloy in four various states. It is obvious that there is a martensite-like form of structure, which can be changed at will either into a sort of globular pearlite or into a fully homogeneous phase.

All alloys up to 10.5 per cent silicon, if cast under suitable conditions, will forge without much trouble. They become brittle on cooling and the more rapid the latter, the more brittleness is induced.

Alloys up to 9 per cent silicon can be ductilized by a process of slow annealing.

The basis of the acid resistant alloys is the compound Fe_3Si . Beyond its composition (14.4 per cent Si), the alloys will show the presence of a secondary constituent which does not disappear on heat treatment. This latter may be Fe_2Si_3 , as propounded by Murakami, or much more probably FeSi , pure and simple. Its presence produces an increased brittleness. The structure of an alloy just above the point Fe_3Si is shown in Figs. 5 and 6.

The Fe_3Si compound is the most plastic and tough composition within the 13 to 16 per cent silicon range and it has also the lowest electric resistivity (42 microhms). Made under suitable conditions, it becomes malleable within a certain range of temperatures.

Carbon has an extensive influence upon the micro-structure and machinability of the alloys (by grinding). Figs. 7 to 9 show how carbon (graphite) precipitates in a low-carbon alloy (0.25 per cent C.) as sand cast and in a high-carbon alloy as sand and as chill cast.

A detailed paper on this whole subject is soon to be published.

Figs. 7 to 9—Influence of carbon upon the structure of a 14.5 per cent alloy. At 0.2 per cent carbon the latter will precipitate at the octahedral cleavages from the solid solution (as sand cast). At higher carbon contents, either a rough or a fine Fe_3Si -graphite eutectic can be obtained. Fig. 7 is at 100 diameters, Figs. 8 and 9 at 500, all slightly reduced from the originals

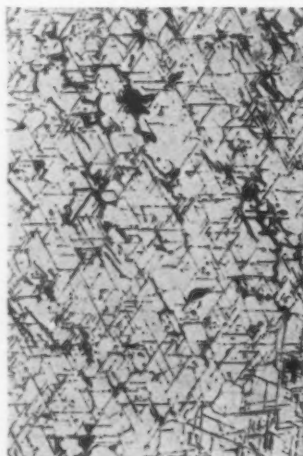


FIG. 7

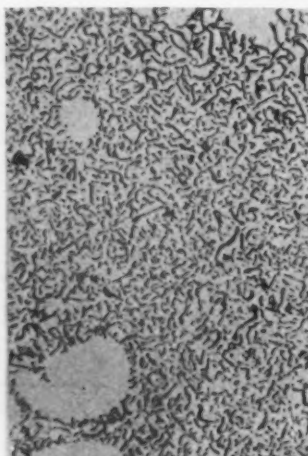


FIG. 8

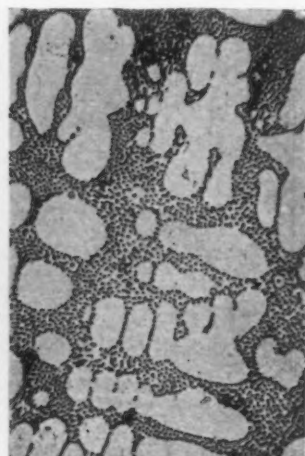


FIG. 9

What Integrated Production Means

Principle of "Simulation," or Multiplication of Simultaneous Operations—Some of the Practical Limitations

BY E. P. BLANCHARD*

WHILE the present is a new era of production made possible by the broader vision of the production engineer, that vision was not granted him in a day. He followed the dictates of common sense and engineering practice step-by-step from his original job of stock-chasing to an ultimate, planned flow of work-in-process. He has coordinated performance, he has studied the habits of labor and the performance of machinery, to obtain greater efficiency. He has time-studied and now he cost-studies every job, every move for economy. He is, himself, a product of integration. His job has been created by the building up of one phase of the work after another to a complete, effective and essential factor in the business of manufacturing.

That he is an established factor is evident, for it has been decreed, by those who do the plain and fancy decreeing, that greater profit per unit is the present objective. But they have not asked the salesmen to sell at higher prices; instead they have asked the production engineer to reduce cost. And somehow the career of the production man promises, from past performances, that he will accomplish this objective.

Getting down to cost-facts and the principles, then, there are two factors which are controlled pretty much from within the shop. Material specifications are determined by the engineering department. But the finished form which those materials must take is accomplished by the production man, with labor and machinery. Working with these two factors he must reduce cost.

Reduction in Importance of Labor Costs

The labor-cost factor is becoming less and less significant. This diminishing of labor-cost started over 150 years ago, when it was determined that a short cycle of operations by each workman, frequently performed, resulted in faster and cheaper production than by letting one man worry through the complete process to the finished product. Motion studies and time studies have given us our present efficient workmen.

But in his evolution, machinery came into the picture and has gradually taken over more and more of the responsibility for performance, to the point where the modern manufacturing process is preponderantly a machine process. These two production principles, the division of labor and the transfer of skill, which have been evident in years past, are brought to attention again, for we may now deduce a new principle in production from some of the facts which can be observed in modern production practice.

The time study man knows that any piece of work can be broken down into the operations of which it is comprised, and the machining time on each operation can be figured accurately. He knows that, with each tool cutting efficiently for each operation, it will require a definite time to accomplish the job. With the mechanical factors of speed and feed, the form of the

cutting tools—all the factors in the tool itself which determine maximum efficiency—being constant and unimpaired, the total accumulated time per tool for all operations on a given piece of work will be the same, whether the work is done with only one tool cutting at a time or with three, thirteen or thirty.

Principle of "Simulation"

The production time for the piece will be shorter with more tools cutting, providing, of course, that the correct mechanical factors of tool efficiency are still maintained in each case. The actual cutting time is shortened by the multiplication of tools in simultaneous operation. Let us coin a word and call this "simulation". This "simulation" factor is mathematical and is true of machine performance in any process of manufacture. Whatever the job may be, if it is broken down into the smallest possible work-units, the accumulated time of performance for all work-units will be the same, though there is a saving in total production time by the combining of work-units and by the "simulation" in performance.

In building the production process, however, these work-units are combined with careful study and attention to the conditions which will assure highest efficiency. That is, the mechanical factors in tool performance must remain unimpaired. This process of combining work-units for highest efficiency is integration.

One cutting tool traversing the length of a plain, straight bar, in turning it, will require three times as long as three tools, equally spaced longitudinally, for the same purpose and working simultaneously. Therefore the "simulation" in this case is three. But if the bar were to have two different diameters, and the cutting feed per minute required a different spindle speed on each diameter, the bar becomes two separate work-units, which cannot be combined under the same conditions. They are not subject to "simulation" except by compromise in the factors.

The same is true in milling operations. Two different milling cutters may be mounted on the same arbor. But if the work requires two different diameters of milling cutters, which justifies a change in cutter revolution to maintain the proper cutting speed, then, here again, are two separate work-units. Work-units in this manner may be multiplied indefinitely and in all manner of work, even in the production process itself—for the complete manufacturing method from raw material to finished stock is but a combination of work-units, each performed under the conditions and circumstances suiting each unit which best adapts it to highest efficiency. We can see this in printing presses, in knitting machinery, looms, paper making, or whatever. The principle is universal.

Limitations and Balanced Work

In metal cutting, however, the work-units or operations of which the finished job is composed must be combined in a manner to comply with the nature of the work. Special attention must be paid to the limits

*Advertising manager and assistant sales manager Bulard Machine Tool Co., Bridgeport. The paper was presented at the production meeting of the Society of Automotive Engineers, Cleveland, Sept. 19.

of mechanical performance of machinery in any one unit. Further, in combining the units, an exact balance of work allotted to each must be maintained. To do this may require splitting up certain of the longer operations, or splitting some of the greater units and increasing the "simulation" in the job. Thus with every factor of the machine performing to its highest efficiency, or every work-unit being performed at the highest possible rate, they will "time" or integrate to a least common multiple. The process to the ultimate finished piece will be performed in the shortest possible time. This, in effect, is a refinement of integrated production.

Obviously, the multiplication of simultaneous operation, with provisions for complying with the mechanical requirements of each, calls for increasingly greater refinement. Multiple tooling is a refinement over one tool. Provision for multiple work-units, with varied conditions for each, requires refinement over multiple units having the same condition for each. This refinement can be carried to whatever extent is justified by the economy resulting therefrom. As an instance, if in cross-facing a surface of large diameter there was sufficient economy to be obtained, a machine could be designed to give a constantly increasing ratio of spindle speed as the tool approaches the center, rather than the present periodical change included in some designs to compensate for the reducing cutting feed per minute. Economy in the materials of which cutting tools are made is even justified in some cases by the nature of the operation, and the work required of the particular tool to accomplish its unit of performance in time to balance with the other units in the piece.

Influence of "Diminishing Returns"

But in working toward greater profit per unit, it must be remembered that every stage in quantity production justifies its own limits in refinement of equipment and methods. There is a point in every job which provides the greatest economy for the particular quantity required. Any point of refinement beyond this peak of economy enters a period of diminishing returns. This is a proportionate figuring of carrying charges on the equipment necessary, as against the operating cost of performance. Fortunately, however, it is fairly simple to figure where the cost of carrying charges too greatly overburdens the operating cost.

It is the part of wisdom to equip for a peak of economy somewhat beyond the proposed production quantity, allowing therein for some expansion and for taking advantage of the most that is justified in refinement. On this point it might be shown that the

relative refinement demanded by certain quantities varies considerably in the smaller quantities of production; but that, as quantities increase, and as refinement is carried to a greater extent, the savings in each case become less and less. The curve of savings flattens out considerably long before we reach quantities which are represented by that indefinite term "mass production."

Referring again to those older principles of production, it can be observed how the breaking down of any job into its small work-units is similar to that principle of the division of labor, and how the skill in the machine is required for each work-unit to meet exactly the mechanical requirements of the operation and the conditions of highest efficiency.

Many Things Make Up Integrated Production

Integrated production, however, goes one step further. It combines the divisions of labor, the transfer of skill and intelligence in each work-unit, properly balanced, and performed simultaneously, to comprise a complete process or method performed in the shortest possible time. Here is a scientific principle, quite modern and subject to even more extensive application, to derive that greater economy which is the present objective of production engineers.

And that economy, which to some may seem to come in dribbles, will, from the financial point of view, show the accumulated results of effort. In present automotive manufacturing processes there are less of materials in inventory and in work-in-process, there is less money tied up, and, in effect, a quicker turnover. Aside from the savings in direct and indirect labor, consider for a moment what the more consistent performance of modern machinery has meant and how much the faster production has saved.

There is the reduction in the raw material inventory, a smaller amount of work-in-process at all times, and a greater flexibility in the process, which avoids overproduction. There is a quicker turnover from raw material to finished goods, with not only a shorter financing period, but smaller amount of money required and less tied up in forms subject to possible loss. Such savings on a national scale, and in the volume which the automotive industry represents, cannot but contribute millions to the favorable financial situation which now exists.

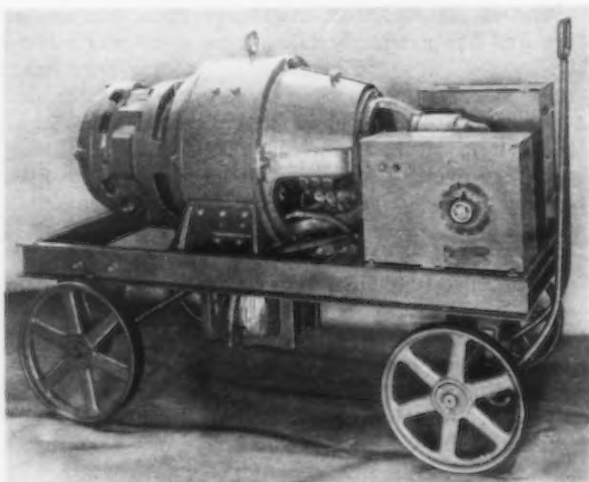
It may be a new point of view, but it is worth while for the production engineer to look beyond the problems in his own shop and to realize how much he has contributed, even to such an ultimate phenomenon as the present national prosperity.

Welding Generator and Automatic Seam Welder

Westinghouse Electric & Mfg. Co., East Pittsburgh, has placed on the market a new arc welder and an automatic seam welder. As shown in the view, the former is a simple compact assemblage, and is built with three ratings (200, 300 or 400 amp.), either portable or stationary. To operate it, all that is necessary is to push a starter button, which actuates three magnetic contactors to build up speed, and turn the rheostat handle to the desired welding current. It is said that an unusually constant current is delivered, despite the normal variations in length of arc maintained by the operator.

Pipe and tanks varying from 10 to 40 in. in diameter, and up to 8 ft. long, of steel plate from 1/16 to 3/8 in. thick, can easily be made on the new automatic seam welder. The shell is held by pneumatic clamps tightly between a lower horn and an upper track, upon which runs the traveling welding head. The latter is equipped with roller bearings; it carries a reel of welding wire, and can be driven in either di-

rection at any speed from 5 to 50 in. per min., or can be released from the gearing for a quick return.



The Arc Welder Is Built in Three Ratings, Either Portable or Stationary

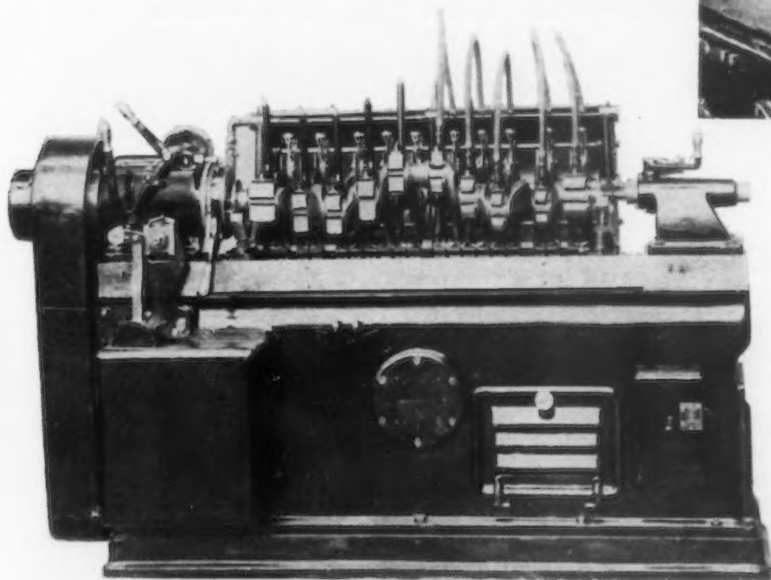
Crankshafts Lapped on Production Basis

Crankpins and Line Bearings Lapped Simultaneously, Smooth and Accurate Surfaces Being Produced at Rapid Rate

A CRANKSHAFT lapping machine, regarded as providing a real production method for lapping any number of crankpins and line bearings simultaneously, has been announced by the R. K. Le Blond Machine Tool Co., Cincinnati.

The time required to lap a crankshaft is determined by the condition after the finish grinding operation. It is claimed that, under favorable conditions, the machine will remove all wheel marks and produce a smooth and accurate surface in no less than 1 min.

The machine illustrated herewith is equipped with a set of lapping arms, a pair for each bearing, these arms having a reciprocating motion following the rotation of the work similar to the connecting rods in a motor. Each arm is held between a pair of guide plates to prevent lateral motion with the work to assure true lapping action. The lapping arms are adjustable for proper spacing. The entire lapping mechanism is carried in a heavy frame hinged at the rear of the bed. There is also a secondary hinged frame for opening and closing the arms. This frame carries a pair of horizontal shafts connected to the lapping arms through a link and chain (the chain being required on account of the reciprocating motion), to a bell crank member by which the arms are supported.



This opening and closing action is controlled by an air cylinder mounted vertically on the rear of the bed.

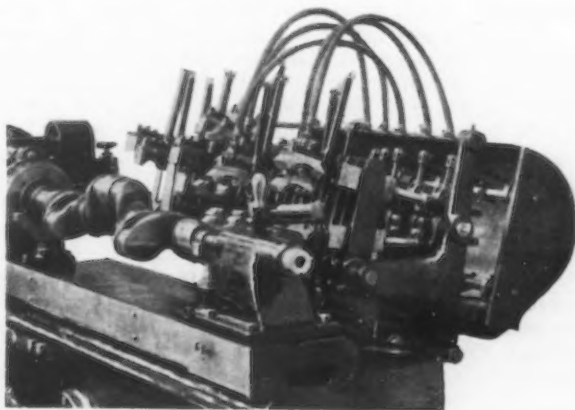
A second air cylinder inside the bed serves to advance the lapping mechanisms to the work. After the lapping arms have been opened by the first cylinder a cam arrangement admits air to the second cylinder, releasing a lock and automatically swinging the entire lapping mechanism away from the work so that the crank may be removed conveniently from the centers, and replaced. One movement of the operating lever brings the lapping mechanism in to the work, the arms closing around the bearings automatically, and reverse movement of the same lever automatically opens the arms and returns them to the starting position. In the open position, the arms are automatically locked in place, which prevents shifting, and this lock is released automatically as the arms close simultaneously around the work. This opening and closing action is quick and smooth, the entire cycle requiring only about 12 sec.

Pressure is applied to the lapping stones by coiled springs inclosed in tubes on top of the arms. The headstock and tailstock are mounted on a reciprocating table actuated by an adjustable eccentric. The head center is of the spring type. End location is taken from the end of the shaft and location for plane is ac-

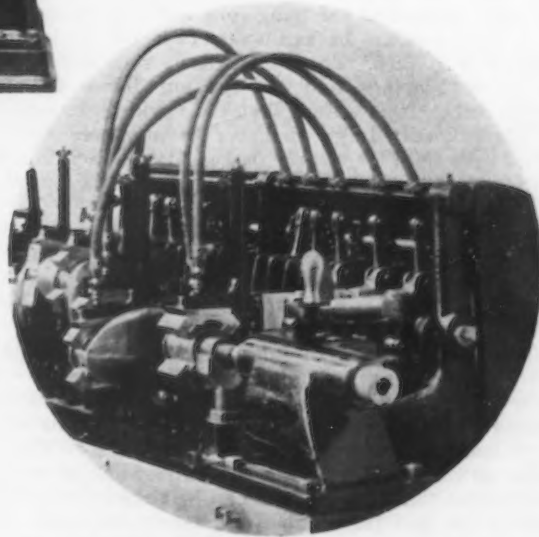
complished by a pin through one of the holes in the flange. There is a lock on the spindle, effective when the lapping arms are in the open position.

The headstock spindle is mounted on Timken bearings. The drive is through a multiple disk clutch controlled by a solenoid and standard electric time element, which automatically stops the spindle after any predetermined number of revolutions.

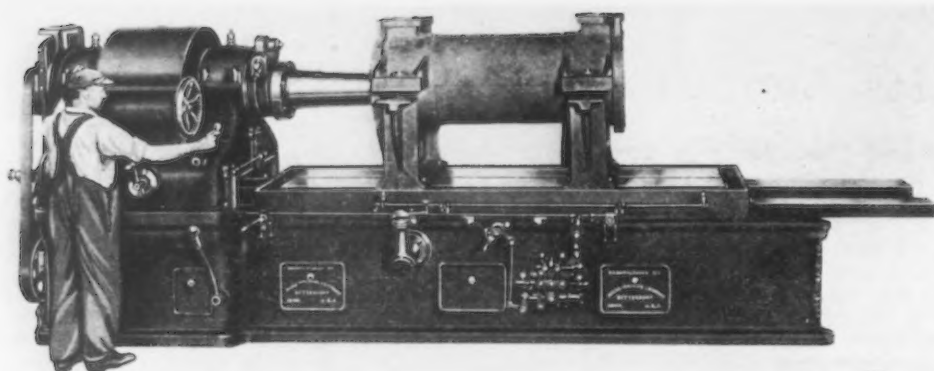
The lapping stones are $\frac{1}{2}$ in. square. Stones of 400 C carborundum are said to have given satisfactory results. To prevent loading of the stones, kerosene is supplied to each arm through flexible armored tubes, the flow of lubricant being controlled automatically



The Left Half of the Machine Is Set Up with Cast Iron Lapping Blocks, and the Right Half with Lapping Stones. Convenience of control is a feature. The close-up views are from the tailstock end, showing the lapping arms opened and closed, respectively



from the spindle. Arrangement has been made for redressing the lapping stones, all stones being redressed simultaneously in about 30 sec., in position on the machine. Cast iron lapping blocks can be used also. For illustration purposes, the machine here pictured is equipped with both, the arms at the tailstock end having stones and those toward the headstock, the blocks.



Internal Grinder Arranged for Grinding the Bore of a Steamboat Cylinder. The main table is driven hydraulically, thus providing a wide range of table feeds

New Heavy-Duty Internal Grinders

Two new heavy-duty internal grinders, one the H. G., with capacity for grinding holes from 5 to 36 in. in diameter and 60 in. deep, and the other the K. G., for holes up to 48 in. in diameter and 84 in. deep, have been announced by the Micro Machine Co., Bettendorf, Iowa.

The main bearing of the H. G. machine, illustrated herewith, is 14 in. in diameter and 48 in. in length. The total eccentric throw of the grinding spindle is 4 in., but this can be increased to 10 in. with special double eccentric design. The main table is 114 in. long and 30 in. wide, and the full length and width of table may be utilized for work mounting. The total table travel is 63 in. The distance from top of the table to center of the grinding circle is 24 in.; the height of the spindle from the floor is 60 in.

A 15 hp., 1750 r.p.m. motor is employed. A variable-speed drive is embodied in the machine for regulating the main spindle speed to suit the diameter of hole to be ground, the change of speed being accomplished instantly from a graduated dial on front of headstock.

The main table is driven hydraulically, providing a wide range of table feeds, including rapid traverse. This hydraulic drive is controlled through a pilot valve which is arranged for operation by a single lever. The eccentric feed mechanism is designed so that the operator may set sliding dogs on side of table to increase automatically the depth of grinding cut at each end of table stroke, this feature being stressed as permitting increased production. A graduated dial is embodied in the eccentric feed mechanism, to permit duplicate sizing of holes quickly.

The main cylinder and main table are lubricated with filtered oil by means of a force-feed oil system. Slide ways are protected from dust. All revolving shafts are mounted on special, selected ball bearings.

The machine illustrated is the model H. G., arranged for grinding a steamboat engine cylinder. The base casting is 15 ft. 6 in. long and 42 in. wide.

The driving motor may be mounted behind machine or in pit. The height of the machine overall is 76 in. The floor space required is 6 ft. by 22 ft. The net weight is approximately 25,000 lb.

Four-High Rolling Mill for Thin-Gage Material

The Standard Machinery Co., Auburn, R. I., has placed on the market the four-high rolling mill here illustrated, which has been designed for the rolling of thin-gage material.

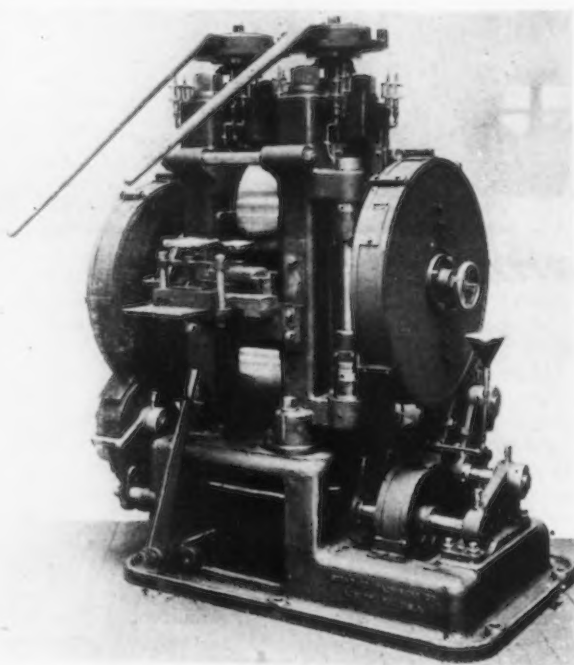
In this machine the working rolls, known as the "baby rolls," are 1½ in. in diameter or larger, depending upon the thickness of the stock to be reduced. In the mill illustrated the baby rolls are 3 in. in diameter, 8 in. face, and are backed up by two rolls 16 in. in diameter, 8 in. face. These backing-up rolls are mounted on roller bearings and are friction driven from the small rolls. It is stated that the backing-up rolls are of exceptionally large diameter as compared with the small rolls in order to provide rigidity, to facilitate free rolling, and to permit withdrawal and radiation of the heat from the smaller rolls.

The drive for the baby rolls is stressed as unique in that it may be disengaged and the baby rolls removed from the mill by one man in approximately 5 min. This drive is designed so that various diameters of the small rolls may be used in the same mill. The mill is motor driven through a friction clutch and all driving shafts are mounted on roller bearings. The baby rolls are water cooled. Stock wipers and stock guides are provided at the front and rear of the mill.

Advantages claimed by the company for the machine as compared with the conventional type two-high mill are as follows: Material can be reduced in approximately one-half the number of passes; the small diameter working rolls do not harden the material and consequently considerable annealing is eliminated; there is no tendency for the stock to be thicker at the center than at the edges; and floor space and power are materially reduced.

An example of what the mill has done in service is given by the company as follows: "Annealed tool steel of 1.00 per cent carbon, 3¼-in. wire, 0.025 in. thick

with 0.0015 in. crown at the center was reduced to 0.007 in. in thickness in six passes without annealing. At the finish the stock was in good marketable condi-



Four-High Rolling Mill With Working Rolls 3 In. in Diameter and Backing-Up Rolls 16 In. in Diameter

tion without crown at the center, and the edges were free from cracks."

The machine was demonstrated during the New Haven Machine Tool Exhibition, Sept. 6-9.

NEW HEAVY-DUTY RADIAL

All Speed Changes in the Head — Entire Spindle Drive Mounted on Ball and Roller Bearings

CONSTRUCTION of the head is an outstanding feature of a new heavy-duty Right Line radial drill, designated as the No. 25, which will supplement the No. 10 medium pattern machine of the same name built by the Niles Tool Works Co. division of the Niles-Bement-Pond Co., 111 Broadway, New York. In the new drill the drilling radius of the unit shown is 6 ft., but machines in 7 ft. and 8 ft. arms lengths will be available.

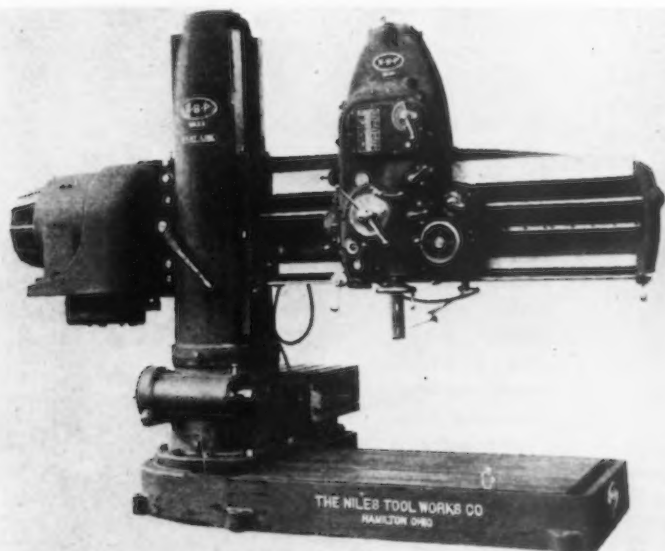
The accompanying close-up illustration shows the head with the front cover removed. All speed changes are embodied in the head itself, and these changes are obtained through selective sliding gears shifted by ball socket levers. The entire spindle drive, including arm shaft, is mounted on ball and roller bearings and sliding gears on the multiple spline shafts with integral keys. There is a 100 to 1 speed range, the minimum being 12 r.p.m. and the maximum 1200 r.p.m. In the d.c. variable-speed drive machine, this range is effected by three mechanical changes of speed, shifted by one lever, combined with the variation of the motor speed. In the a.c. constant-speed drive, there are 24

The spindle is $3\frac{3}{4}$ in. in diameter at the driving point and is bored for a No. 6 Morse taper. Feed thrust is supported by roller bearings. The spindle is counterweighted by a spiral coiled spring inclosed in the head on the spindle rack pinion shaft. Spring tension may be adjusted from the outside of the case.

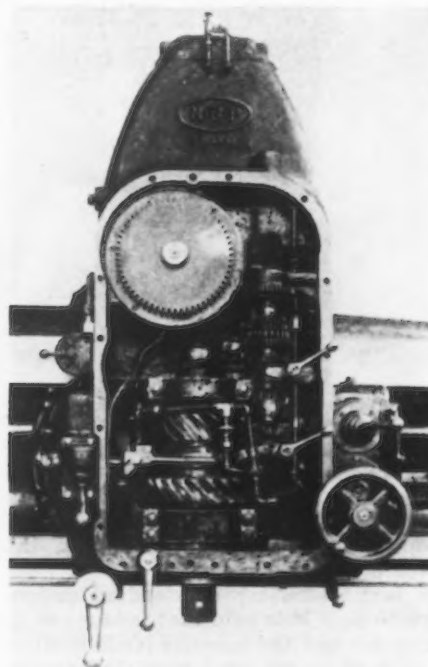
The head is moved along the arm either by hand or by power. Power traverse is obtained through a worm-gear connection from the arm shaft to reversing frictions on the rack pinion shaft. The hand wheel is connected to the rack pinion shaft by spur gears and a jaw clutch. The rate of power traverse is 25 ft. per min.

The arm is of heavy section with the lower bearing surface set back to give increased torsional strength to the arm. It is supported and slides on the column on four V-ways. A single lever is used to elevate or lower arm and clamping to column and is so arranged that when arm is clamped, none of the elevating gears are in motion. Power for raising or lowering arm is taken from sliding gears on a worm shaft meshing with a gear on the arm shaft sleeve. Worm wheel runs in oil and is geared to a revolving nut on the elevating screw. The arm clamp is operated by a nut and screw through equalizing bar with double leverage. The rate of the arm elevating traverse is 35 in. per minute.

The main body of the column is divided into two box



Speed Changes Are Obtained by Selective Sliding Gears Shifted by Ball Socket Levers. The head is inclosed in an oil-tight case, all gears and shafts being lubricated by a pump inside of the head



spindle speeds, obtained mechanically through the movement of three levers. Reverse for tapping and other operations is by reversing the motor.

The final drive to the spindle is through a double set of worm gearing of special tooth form mounted at the lower end of the spindle. The worms are of hardened steel and worm wheels are of bronze. The smaller worm wheel takes care of the higher speeds, 300 to 1200 r.p.m., the larger one being in engagement for speeds from 12 to 300 r.p.m. These worm wheels are mounted on a sleeve on the spindle, the high speed one being engaged by means of a jaw clutch on the arm shaft sleeve, the low speed worm by a jaw clutch on the spindle. For the high speed ratios on the d.c. machine there is but one worm wheel contact between motor and spindle.

There are 16 feeds ranging from 0.005 in. to 0.125 in. including pipe tap leads also for 8, $11\frac{1}{2}$ and 14 threads per in. Feeds are varied by two levers, an index plate indicating the feed selected. All hand propelled feed and traverse gears to spindle are mounted on ball and roller bearings.

The head is inclosed in an oil-tight case, and gears and shafts lubricated by means of a pump mounted inside of the head. The worm gears are lubricated by pressure through two nozzles. Other gears and bearings have gravity lines from a reservoir in the top of the head.

form sections. There are four V-ways on which the arm slides, which not only provide guide for the arm, but also give a wedge action when clamped, that renders the arm and column a rigid unit. The lower end of column is of circular section and extends into the pedestal. The connection between column and pedestal is through large roller bearings and an adjustable split tapered bush at the bottom end. A balance spring is mounted inside the column, adjustable from between the column ways, and made to support the weight of the machine on a ball thrust bearing when unclamped. The clamp consists of two half rings, hinged at one side and contracted by nut and screw on the other side. The clamp is operated by a $\frac{1}{4}$ -hp. motor through worm gearing. Provision is also made to clamp by hand lever. The base has a trough cast around it to drain lubricant into reservoir under the box table. The coolant pump is under the box table so that it does not interfere with the removal of the table. Every control for the machine is centralized on the head with the exception of the arm elevating lever.

Some of the dimensions of the machine are as follows:

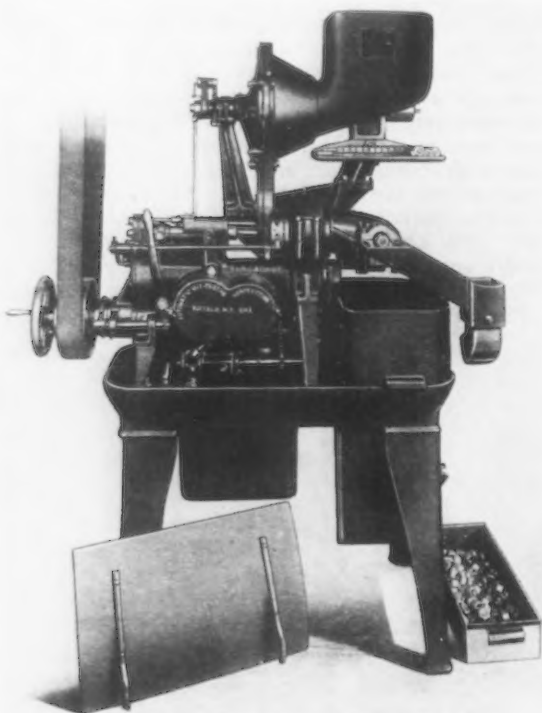
Drills to center of 72-in. circle on the base; distance from face of column to spindle is 17 in. minimum and 77 in. maximum; traverse of the head on the arm, 5 ft.; distance spindle to base, 14 in. minimum, 78 in. maximum; vertical spindle traverse, 18 in.; and vertical arm traverse, 46 in. The net weight of the machine with motors is 28,000 lb.

Taps Nuts Automatically in Sizes of 9/16 to 7/8 In.

A new nut threading machine of the continuous tapper type, for high production, using a bent shank tap has been brought out by the Automatic Nut-Thread Corporation, 24 West Tupper Street, Buffalo.

The machine, designated Threadnut No. 2, is equipped with hopper feed and is fully automatic.

It has capacity for tapping hex or square hot pressed, cold punched, or brass nuts from 9/16 in. U. S. Standard to 7/8 in. S. A. E., special tooling being pro-



The New Register Device for Presenting Nuts to the Tapping Jaws Is a Feature

vided for the intervening sizes. The production speed recommended is 15 U. S. Standard nuts and 10 S. A. E. nuts per min., although it is stated that on test the machine has tapped more than 18 3/4 in-10 in. U. S. Standard nuts per minute.

A bent shank tap of standard design, is used on the machine. It is said that because of the method of holding the tool the machine lends itself readily to the use of high speed steel taps, the percentage of tap breakage being reduced to a minimum.

Compactness is a feature of the machine. Ball bearings are used throughout and all bearings and gears are inclosed and run in a bath of oil. The machine is equipped with a single clutch pulley drive and an automatic safety clutch throw-out is provided to stop the machine if the feeding mechanism should become clogged, thus preventing breakage, either of the machine or taps. The hopper, of new design, is of the rotary drum type. Change from one size of nut to another may be made conveniently, the time required being said to be from 15 to 30 min.

A feature stressed by the makers is a new type of register device for presenting the nuts to the tapping jaws, which turn the nut over the stationary tap.

Information About Springs

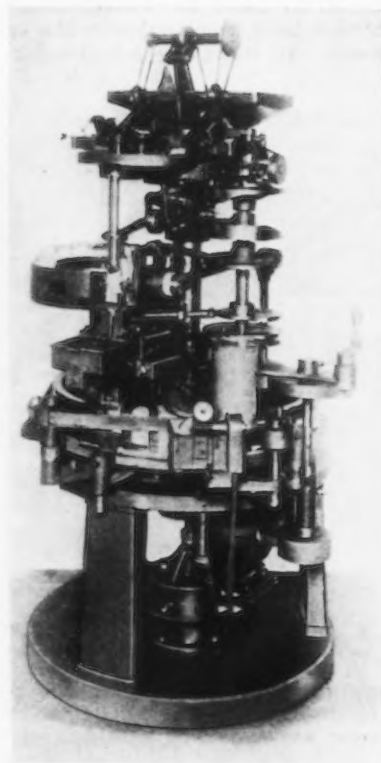
"Spring No. 1, Coil No. 1" of an attractive 8-page monthly publication, THE MAINSPRING, has been issued by Wallace Barnes Co., Bristol, Conn. Its editorial scope is to discuss the fundamentals of spring making and design in terms understandable by all spring users (to whom it will be mailed upon application). The leading article in the first issue points out the great difference in function of nearly all metal parts, where rigidity is essential, from springs, where resiliency is the first consideration.

Automatic Machine for Enveloping Screws, Washers and Other Pieces

A full automatic machine for enveloping screws, nails, washers and similar articles that can be hopper fed for counting has been brought out by the General Engineering Co., 106 Ann Street, Hartford, Conn. In addition to counting and delivering the pieces into envelopes, the machine checks by weight for shortage, seals the envelope and delivers the package ready for shipment.

The screws and other pieces to be packaged are fed from hoppers and are counted out on to a revolving dial having a number of holes. The counting may be varied as to number and also as to the combination of pieces, such as washers and screws, nails and screws, etc. This dial carries the pieces in each hole around to a chute from which they drop through a loading mechanism into the envelope, which in turn passes to a weighing device where the count is checked by weight. From this position the filled envelope passes to a conveyor, the envelope being subsequently gummed and sealed. The filled and sealed envelopes are delivered

Screws and Other Pieces to Be Packaged Are Counted on a Revolving Dial. Automatic electric control provides safeguards against operating contingencies



into a tote box at the left hand side of the machine at the rate of 60 to 65 per minute.

Automatic electrical control is provided so that the machine will stop automatically in case the hopper jams, envelopes fail to feed, or short count is delivered to the envelope. The machine can be arranged with four hoppers, each of which will feed a different article, if so desired, the combination of articles being collected in the dial and then fed into the envelope. This machine was demonstrated during the New Haven Machine Tool Exhibition, held Sept. 6-9.

Shipments of Sheet-Metal Ware

Galvanized sheet-metal ware shipped in July is reported by the Department of Commerce at 160,648 dozens, valued at \$602,551. This compares with 166,081 dozens in June, valued at \$650,336. In July, 1926, shipments were 161,315 dozens, valued at \$618,373. About four-fifths of the quantity and a little more than two-thirds of the value are represented by pails and tubs.

Shipments of enameled sheet-metal ware in July are reported by the department at 248,893 dozens, valued at \$887,603. These figures are much the lowest of the year, comparing with the previous low figures in June of 292,358 dozens and \$1,025,361.

THREE-TON ELEVATING TRUCK

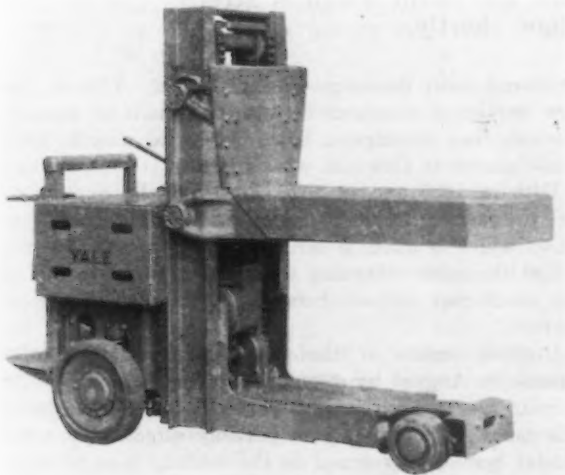
Sturdy Framework, Use of Anti-Friction Bearings and Ease of Steering are Features

THE Yale & Towne Mfg. Co., Stamford, Conn., has brought out a new 3-ton high-lift electric industrial truck designated as the model K25, features of which include sturdy construction and liberal use of anti-friction bearings.

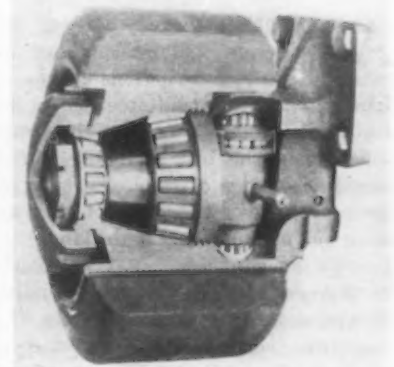
The framework of the truck includes a large gusset plate $\frac{1}{2}$ in. thick, which extends from the forward end of the machine to the small or trailing wheels. This plate is approximately 24 in. high at driving wheel axle, and in addition to forming the framework, it provides a yoke to serve as a guide for the drive unit and the spring suspension of the truck. The upright channels or platform roller guides are attached to this gusset plate through $\frac{3}{4}$ -in. rivets, and in addition by welding strips of steel either side of the vertical channels to

platform members are heavy steel castings, having large diameter bosses to support the platform roller pins. The castings are shaped to reach around the vertical channels and at the same time permit the use of an elevating platform narrow enough to clear standard skids. The overall width of the platform is 27 in., the height 11 in., and the length 54 in.

The main drive unit is of the double reduction spur-gear type, driving the wheels through totally inclosed universal joints. The entire gear reduction with its differential and bearings run in a bath of oil. In order to reduce the physical effort necessary to steer the machine, the steering knuckle king pins have been fitted with ball and roller thrust bearings. On the small wheels, which come directly beneath the load, the steering knuckle king pins, in addition to being fitted with the roller thrust bearings, are also equipped with an upper and lower roller bearing to take the radial load. These small wheels are fitted with roller bearings on all the moving parts, and each wheel assembly contains five bearings. A four-wheel steer feature allows a



Sturdy Construction and Liberal Use of Anti-Friction Bearings Feature This Truck. Section at right shows how the small wheels are swiveled



serve as a pocket or guide. The structural parts of the truck are joined with $\frac{5}{8}$ and $\frac{3}{4}$ -in. rivets.

Raising and lowering of the elevating platform is by means of a $1\frac{1}{2}$ -in. Diamond roller chain, which passes over a power-driven sprocket at the bottom, and an idler sprocket at the top of the machine. Hyatt heavy-duty roller bearings are employed in the idler sprocket. The shifts of the lower sheaves run in a bath of oil, which also serves to lubricate the spur-gear reduction unit. The two ends of the roller chain are attached to the platform through a spring take-up device, which automatically adjusts itself as the chain wears.

The hoisting motor is connected to the pinion through a spring ratchet, so arranged that a positive drive is obtained when elevating the platform. If the platform is checked in its downward travel, the ratchet merely releases, and therefore, causes no injury to the mechanism of the truck. The ratchet when slipping makes considerable noise, so that the operator is immediately warned that the truck platform is bearing on some obstruction. A speed of $7\frac{1}{2}$ ft. per min. is obtained when lifting a full load, and a speed of 19 ft. per min. when raising the empty platform. The lowering speed is 19 ft. per min., loaded or empty.

The elevating platform is supported in the horizontal position by four rollers bearing on the inside of the flanges of the vertical ship channels. These channels have a depth of 9 in. and a flange of $3\frac{1}{2}$ in., which permits use of a relatively large diameter roller, with a wide face. The rollers are equipped with Hyatt "heavy-duty" roller bearings, and with a hardened steel thrust washer to take whatever end thrust may occur when lifting loads that are not placed on the center line of the platform. The pins which serve as a spindle for the roller bearings are made eccentric, so that by rotating the pins the platform may be tilted upward or downward to compensate for wear on the surface of the rollers and on the face of the vertical channels. The

turning radius of 96 in. to the outside edge of the truck.

It will be noted that in this design the top of the battery box is left clear, which permits servicing or watering of the battery, without sliding out the battery. The battery itself may be removed by hoisting it out of the battery box, or by removing the side plate of the box and sliding the battery out sideways.

Simplification of Jack Chain

Manufacturers of jack chain held a preliminary conference Aug. 25 under the auspices of the Division of Simplified Practice, Department of Commerce, Washington, looking toward a standard list of sizes and varieties. Preliminary steps were taken toward formulating a simplified practice recommendation. P. H. H. Dunn of the Division of Simplified Practice, presiding at the meeting, outlined the procedure followed by his division in cooperating with industry in eliminating avoidable waste. The benefits to be obtained through that means were discussed.

It developed that jack chains are manufactured in an excessive variety of sizes and that certain of these sizes form only a small percentage of the demand. Elimination of these sizes, it was felt, will do much to better conditions in the industry. Accordingly, those present appointed themselves a committee with A. B. Way, representing the Turner & Seymour Mfg. Co. and Sargent & Co., as chairman. This committee will conduct a survey of current practice with regard to production and sale of jack chain. This survey will cover, in addition, chain for plumbers' use and safety, ladder, and register chain. Manufacturers will be asked for their opinions regarding elimination of various sizes.

Members of the committee, in addition to Mr. Way, include John S. Black of the Corbin Screw Corporation, Charles C. Swartz of the H. & O. Chain Co., and E. J. Trevethan of the American Chain Co.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Current Statistical Data, Considered Independently
of Trade Opinion, Indicate That:

Gradual upward trend in unfilled orders may presage slowly increasing future prices.

Pig iron production has come into line with ingots. But prices probably will not advance unless coke prices are raised.

Commodity prices have begun an upward movement which is accelerating and may cause steel prices to follow shortly.

ACCORDING to our way of figuring, steel ingot production still holds above the normal requirements of the country. This conclusion is, perhaps, confirmed by the fact that steel prices have averaged below a normal level so long; for the proof of the industrial pudding, in the last analysis, is found in prices. As long as the price of steel continues to show a prolonged low margin over the price of the raw materials (there being no unusual accumulation of stocks to work off) it must be concluded that production is "too large." In this connection, too, the conditions prevailing in Europe deserve mention. Surely any appraisal of the long-time trend of domestic production of steel that does not allow for the post-war comeback of European steel makers is an abnormal one—not normal.

Ingots Increased More Than Usual

BE this as it may, our adjusted index of ingot production in August showed an increase that was a little greater than usual for that month, even after making allowance for the regular long-time monthly rate of growth in the industry. At approximately 3,471,000 tons, we arrive at an index of 105.8 per cent of normal, which compares with 101.9 in July and with 125.2 a year ago. August was a long month in the sense of having 27 working days, against only 26 last year. It may be also that seasonal conditions, as they affect the month of August, have changed in recent years. But the fact remains that steel production was not curtailed further in that month as we had

considered both desirable and probable. This is the more worthy of comment because our index of demand indicates that production has for several months been a little excessive (see last week's issue).

Both in 1925 and in 1926, however, the September steel production failed to make the usual seasonal increase, which is about 5 per cent over August. It may be that the same situation will arise this year, and in that event our adjusted index may still fall below "normal."

Unfilled orders of the Steel Corporation usually increase in August by about 1 per cent. Last month, the gain was more than 1.2 per cent, or a little more than usual. Though it was possibly affected by some unusual business assigned to the month, it is at least moderately encouraging that no decline occurred. Our adjusted index is 67.5 per cent of the average for the six years 1921-1926, which compares with 67 per cent at the end of July.

The index of average prices for finished steel and for billets both remain unchanged for the month of August. Finished steel prices continue at about the average level for the year to date. In view of the smaller production it seems clear that the earnings of the average steel producer must show a decline in the third quarter.

At this writing, it is still true that there is no sign of any pronounced strength in the steel markets. Probably none is to be expected as long as production continues in the neighborhood of 6 per cent above nor-

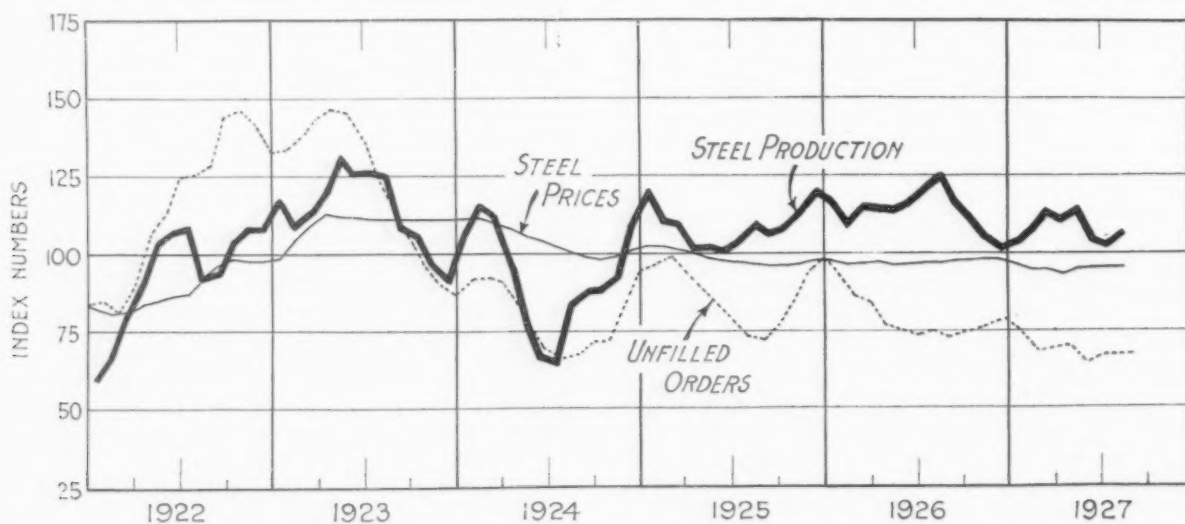


Fig. 1—Steel Production Increased More in August Than Is Usual for That Month. Prices have been virtually unchanged for months. Unfilled orders have made a slight recovery from an unusually low level

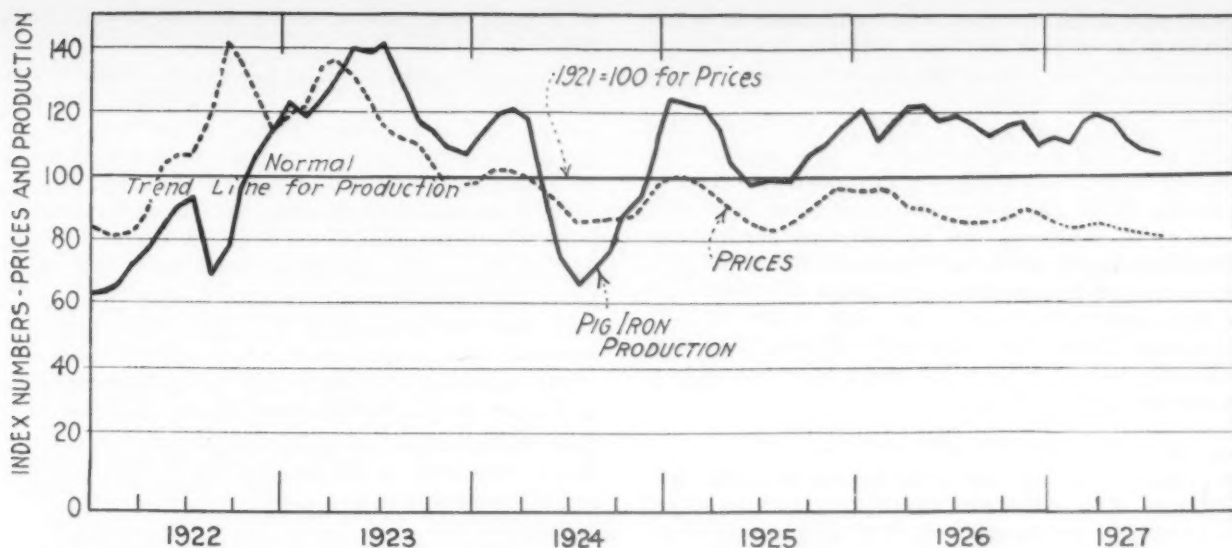


Fig. 2—Reduced Output and Continued Drop in Prices of Pig Iron May Reach Bottom This Month. But any recovery in the pig iron market must depend upon developments in steel

mal, while unfilled orders hang at 67 per cent of the average for recent years. A continued stable condition of steel prices seems to be a logical expectation for the next 30 days.

Pig Iron Output Now in Line With Steel

CONTRARY to the course of steel production, the output of pig iron held its downward trend during August. The adjusted index for the month is 106.4 per cent of normal, against 107.7 in July and 116.6 a year ago. In other words, it is estimated that pig iron production fell from nearly 8 per cent above normal in July to 6.4 per cent above in August. This represents the lowest annual rate of pig iron production for any month since October, 1925.

The average price of pig iron for the month, based on THE IRON AGE composite, reached a new low point for recent years at \$18.13. This compares with \$18.51 in July and with \$19.46 in August, 1926. The preceding lowest monthly average was \$18.14, in February, 1922.

Certain symptoms, which are evident to the statistician at least, suggest that the bottom of the decline, both in production and prices, may be reached this month. For one thing, the adjusted indexes of production for pig iron and steel ingots are now in close

proximity, one being 106.4 and the other 105.8. This is the first time they have approached so closely since the September-October period last year. A year ago, when there was a rise in steel production and a decline in iron production, it foretold a little recovery in the price of the latter commodity.

In the second place, the average daily production of pig iron is now nearing a level where, at several times in recent years, a decline in the market has been checked. Again, it is probable that stocks of pig iron have recently been somewhat reduced, since the ratio of pig iron to steel production has declined. Finally, our adjusted curve of pig iron production gives the appearance of a decline that is "tapering off," or losing momentum, and the same is true of a twelve-month moving average of pig iron prices.

Pig Iron Depends Upon Steel

But clearly any recovery in pig iron prices must wait upon developments in the steel market. According to August data, the production of pig iron is still so large compared with that of steel that, in view of the low prices obtaining for steel, no general advance can be said to be in sight. It seems that, while pig iron prices are at bottom levels, the only condition that

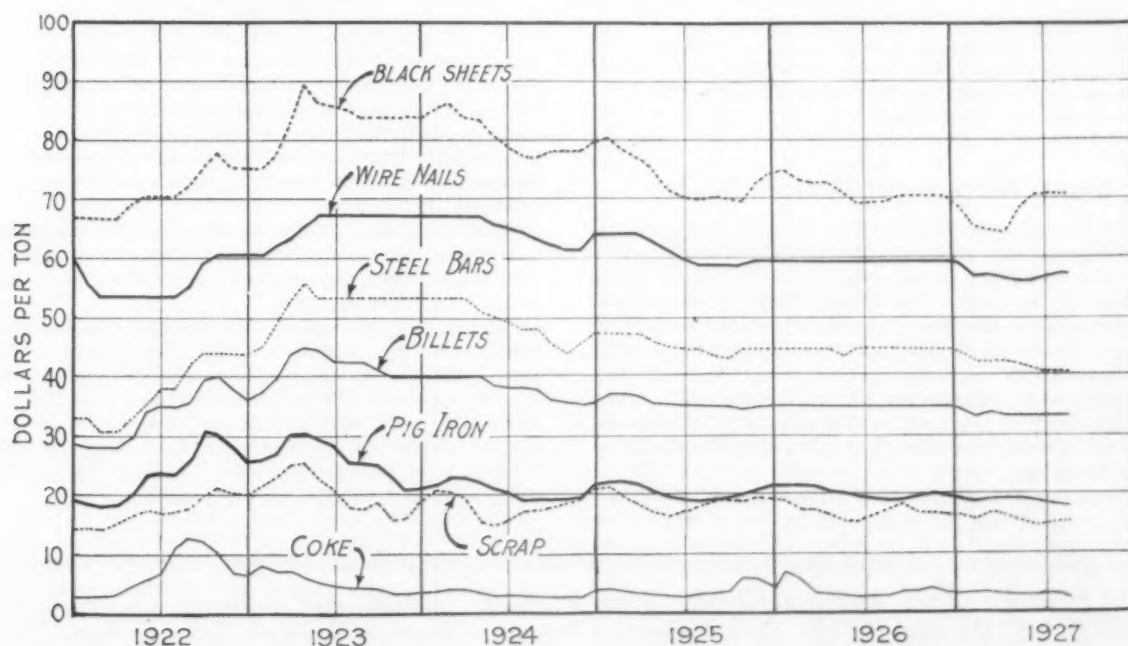


Fig. 3—Finished Steel Prices Continue Low with Regard to Semi-Finished and Raw Materials. The inadequate spread indicates a need for higher steel prices, unless pig iron and other intermediate products go lower

could cause a decisive general advance would be a rise in the price of coal and coke. The prospects for a settlement of the coal strike, however, make such a rise seem rather remote.

The prices of coke, pig iron and heavy melting steel scrap are about normal in relation to one another, the price of scrap being perhaps a little high relatively to the other items. Except for scrap, the prices mentioned seem to be nearly as low as they can possibly go. Nevertheless, the prices of semi-finished and finished steels are low in comparison with these raw materials. In fact, semi-finished steel is in a vise, caught between low prices for finished steel and *relatively* high raw materials, and its price is not likely to move one way or another for a good while.

Price Structure Has Small Change

DURING the first half of September the only definite changes in the iron and steel price structure were a decline in the price of spot furnace coke from

\$3 to \$2.85 and a decline in the pig iron average from \$18.13 to \$18 flat.

The whole price situation has got itself into a sort of vicious circle, and it is yet quite uncertain what will bring a change sufficient to break it up. On the one hand, it is difficult to see how pig iron can advance in the near future unless coke prices are raised. On the other hand, coke does not seem likely to advance unless there is an expansion in the requirements of the iron and steel makers. Weighing down upon the whole situation is the continued lack of a demand for finished steel sufficient to allow a good spread over the raw material.

As the possibility that coal strike developments may start an upward movement, based on higher fuel costs, becomes more remote, there grows the probability that developments in the consumption of steel by automobile producers or railroads must be looked to for the solution.

Not Much Decline in Straits Tin Shipments

WASHINGTON, Sept. 20.—During 1926 Malaya had an average monthly shipment of 6361 gross tons of tin, the average to the United States being 3709 tons, representing more than half of the American receipts of metallic tin by quantity, says a report received by the Department of Commerce from Vice-Consul John H. Bruins, Singapore. During the first five months of the present year, Malaya shipped 29,809 tons of tin, of which 18,360 tons or 3670 tons per month, went to the United States. The report continues:

There is little definite knowledge of Malaya's actual tin resources, geological surveys being most inadequate. Prospectors claim that their efforts are not adequately protected under the existing laws governing mining leases, and agitation for better mining laws or more government protection have been continuing for some years without definite result. Possibly the arrival of a new governor in June of this year justifies the hopes that some action may be taken.

Meanwhile tin production goes on at about the usual rate. The drop due to the January floods was not so serious as predicted. Statements that the tin of the Malayan Peninsula is practically exhausted recur frequently and receive wide publicity not only because they are spectacular but because the local producers want better leasing rights. The fact is that such statements are based on very superficial surveys and that no one knows definitely what the tin resources of Malaya are.

So far as can be estimated at present, the total Malayan tin exportation in 1927 will be comparable to that of recent years, from 70,000 to 80,000 gross tons. This estimate is based on visible ore deposits and the present rate of production.

Many More Steel Barrels Made

Steel barrels manufactured in August are reported by the Department of Commerce at 615,152 units, compared with 578,223 units in July and with 523,037 units in August of last year. The current figure is the largest since June, 1926. Shipments kept pace with production, having aggregated 610,454 barrels, again the largest since June, 1926.

Unfilled orders at the end of August showed a sharp reduction from a total of 1,346,688 a month before to 1,106,604. Of this number, 244,518 called for delivery within 30 days.

Shipments of members of the Steel Barrel Manufac-

turers Institute in August are reported at 364,679 barrels, of which all but four, which went to Canada, were for domestic use. More than one-third the total were shipped to New Jersey, Pennsylvania and New York taking the bulk of the remainder. Business of the month is reported at \$1,121,011. Capacity was employed to the extent of 24.8 per cent for I. C. C. barrels and 57.4 per cent for light barrels—the total being 50.2 per cent.

Wholesale Prices Advance Sharply

Prices of commodities at wholesale are reported by the United States Bureau of Labor Statistics to have advanced about 1½ per cent in August as compared with July. The index was 146.6, against 144.6 a month earlier and 149.2 a year ago. Nearly all of the large groups participated in the advance. Farm products in particular jumped from 140.5 to 146.2.

Metals and metal products continue in the lowest position, although they advanced from 118.9 to 119.9. Iron and steel, included in this metal group, remain at about 129, while non-ferrous metals went up from 96.1 to 99.8. Clothing at 173.4 remains highest of the entire list, with building materials, fuel and housefurnishing goods following in that order.

Decline in Bookings of Fabricated Structural Steel

Bookings of fabricated structural steel in August are reported by the Department of Commerce at 241,680 tons, representing 76 per cent of capacity. While this is the largest figure but one in more than a year and a half, it shows a sharp reduction from the 311,640 tons in July, representing 98 per cent of capacity. These figures are computed from reports of 190 firms in August and 202 in July.

For the eight months of the year, bookings aggregated 1,803,060 tons, or 71 per cent of capacity. This was 3½ per cent higher than the total for eight months in 1926, at 1,742,640 tons.

Shipments ran ahead of bookings in August, and represented the highest month's total in more than a year. The computed total was 260,760 tons, or 82 per cent of capacity. This compares with 232,140 tons in July and with 248,040 tons in August of last year. Shipments in the eight months have fallen more than 10 per cent behind last year, having been 1,704,480 tons, against 1,904,820 tons a year ago.

Schedule of the next installments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director of New York University Bureau of Business Research, follows: Sept. 29—General Business Outlook; Oct. 13—Activity in Steel Consuming Industries; Oct. 20—Position of Iron and Steel Producers.

AUGUST SHEET SALES LOW

Shipments Considerably Ahead of Bookings and Moving Against Old Contracts

With sales of only 177,647 net tons, August will go down as one of the leanest months that sheet manufacturers reporting to the National Association of Sheet and Tin Plate Manufacturers have had in recent years. While monthly sales have dipped under 200,000 tons several times in the past two and one-half years, there has not been a month in that time when they have been less than 180,000 tons until last month.

Shipments ran almost 90,000 tons in excess of new bookings, suggesting that consumers still had considerable tonnage due them on older purchases and drew against these commitments to the extent of more than one-third of their requirements, taking the shipments during the month as requirements.

Unfilled orders amounted to 312,662 tons at the end of August, as compared with 353,413 tons one month before; as of Aug. 31, 1926, they stood at 521,837 tons.

Production last month was 80.3 per cent of rated capacity. It is understood that in the near future the association will adopt a different and higher rating of mill capacities in keeping with the fact that 7.65 net tons per turn of sheet mills and 22.635 net tons per turn of jobbing mills have not for some time represented average mill performance. In the past, the statistics have often shown production at more than 100 per cent, which is possible only when the rating is too low in relation to potential production.

The August figures with comparisons follow:

	August	1927— July	June	August, 1926
No. of mills.....	719	719	712	710
Capacity per month....	457,315	407,200	433,710	432,650
Percentage reporting....	72.6	72.6	72.3	73.8
Sales	177,647	230,715	224,321	283,055
Production	266,645	237,715	300,706	293,703
Shipments	266,713	252,034	281,395	281,602
Unfilled orders.....	312,662	353,413	399,562	521,837
Unshipped orders.....	114,762	109,836	120,295	102,874
Unsold stocks.....	54,553	44,538	47,860	44,988

Percentages of Capacity				
Sales	53.5	78.1	71.6	88.6
Production	80.3	80.2	95.9	92.0
Shipments	80.3	85.3	89.7	88.2
Unfilled orders	94.2	119.6	127.4	163.4
Unshipped orders	34.6	37.2	38.4	32.2
Unsold stocks	16.4	15.1	15.3	14.1

Discuss Uses of Rail Steel

Several speakers addressed the recent sales and engineering staff conference of Sweet's Steel Co., Williamsport, Pa. Silas M. Haight, civil engineer, Elmira, N. Y., detailed some of the results of research into qualities and uses of steel for special purposes. In particular, he told about fence posts made of steel channels and tested for wind loads and as snow brakes.

Prof. D. F. McFarland of the Metallurgical Department of Pennsylvania State College presented a history of the rerolling steel process, together with results of laboratory tests on rerolling steel products. He was particularly seeking information regarding strength and durability and studied these qualities in mine rails, bedstead angles, fence posts and numerous other articles.

Refractories for Heat-Treating Furnaces Discussed at Hartford

On Sept. 13, the Hartford Chapter of the American Society for Steel Treating met for the first time for the season of 1927-1928 in the Hartford Electric Light auditorium at 266 Pearl Street, Hartford. The speaker was J. A. King, New England representative for the Carborundum Co., Niagara Falls, N. Y., whose talk on "Special Refractories for Heat-Treating Furnaces" created considerable discussion. Mr. King interested his hearers by sketching the development of specialized silica-carbide refractories through the past nine years and pointed out the advantages and drawbacks of different types of applications. Also he demonstrated the recent developments in measures that can now be applied to overcome certain characteristics of these ma-

terials. Following his talk an hour was given over to discussions of a general nature regarding heat-treating subjects.

This was the first meeting presided over by the new chairman, David A. Nemser. The program committee is headed by vice-chairman John C. Kielmann and Henry I. Moore is secretary and treasurer. About 70 members and guests were present.

Gear and Portland Cement Associations Join Standards Committee

The American Gear Manufacturers Association and the Portland Cement Association have become members of the American Engineering Standards Committee, with direct representation on the main and executive committees.

The American Gear Manufacturers Association, with headquarters in Cleveland, is made up of 94 member companies. It has been active for many years in standardization work, having to date adopted five association standards and 33 recommended practices. George L. Markland, Jr., chairman of the board, Philadelphia Gear Works, Philadelphia, represents the association on the A. E. S. C., with S. L. Nicholson, Westinghouse Electric & Mfg. Co., as alternate.

The Portland Cement Association, organized in 1902, maintains 31 district offices and spends a very large amount annually in research and standardization activities. Two-thirds of its 490 employees are experienced engineers. At its laboratory some 45,000 tests are made each year to learn more about the best ways to use cement in concrete work. These facts are then broadcast to aid cement users. F. W. Kelley, president North American Cement Association, represents the association as a member of the A. E. S. C. executive committee.

Ford Motor Co.'s Machine Tool Changes Cost \$15,000,000

A recent issue of *Ford News*, the company publication of the Ford Motor Co., Detroit, states that the retooling of the plants of the Ford company, preparatory to the manufacture of a new model automobile, has cost about \$15,000,000. Of this, roughly \$10,000,000 went for the purchase of new equipment, totaling about 4500 items, of which \$1,000,000 was spent for punch presses and several hundred thousand dollars for new welding machines.

For the production of the new rear axle, it was stated, 166 machines were rebuilt at a cost of \$3,000 each to produce two gears of the new assembly. A total of 43,000 machine tools was used in the Ford plants prior to the time changes were undertaken for the production of the new model. The total expenditure involved in plant changes before one car comes off the line is put at \$22,000,000. More than half the machine tools in the plants have undergone the rebuilding process to some extent.

Employment Declines in Ohio Metal-Working Plants

August reports from 56 foundries and machine shops in Ohio show a decline in employment of 6.7 per cent from the level maintained since September, 1926, states the current bulletin of the bureau of business research of Ohio State University. With an average month in 1923 taken as 100, the August index stood at 89.9, which was approximately the same as in August, 1926. Twelve Ohio steel plants and rolling mills reported a continuation for the third month of the decline which started in June. The decrease from July was 3.6 per cent and from May, the peak month of this year, 8.4 per cent. Statistics from 24 automobile makers and automobile parts manufacturers in Ohio revealed the fact that the August index was 2.8 per cent less than in July, 17.6 per cent less than in April, 1927, the peak month last spring, and 16.1 per cent less than in August, 1926.

Heavy Movement of Iron and Steel by Water

Still another high record was reached last month in the river movement of iron and steel products, according to the monthly report of the United States Engineers' office at Pittsburgh. A total of 196,154 net tons was moved on the Allegheny, Monongahela and Ohio rivers within the district of the Pittsburgh office, which compares with 124,507 tons in July, which was the previous high record. For the eight months ended with August shipments aggregated 753,172 tons, an average of more than 94,000 tons a month. With four months to go, the movement for the year may well reach 1,000,000 tons. General use of the rivers continues to expand, as is seen in total river commerce of this district of 3,473,101 tons last month, which exceeds the best previous showing, made last March, by 70,000 tons. Total tonnage handled for the eight months ended with August amounts to 23,996,868 tons.

August shipments in net tons, with comparisons, follow:

	August	July	June	Eight Months' Total
Coal	2,195,469	2,036,687	1,836,477	17,302,223
Coke	170,957	228,403	190,752	1,130,667
Gravel	374,243	347,199	352,514	2,061,304
Packet cargo ..	5,085	5,452	4,494	35,908
Sand	500,598	495,928	435,334	2,494,762
Iron and steel ..	196,194	124,507	92,384	753,172
Unclassified ...	30,595	21,069	33,301	218,832
Total	3,473,101	3,259,245	2,929,511	23,996,868

Dismantling a Rolling Mill

Both the rolling mills and the steel works of J. Spencer & Sons, Ltd., Newburn, England, have been sold for salvage to Thomas W. Ward, Ltd., Sheffield. According to an item in a recent issue of *Engineering* (London), the plant occupied 43 acres on the north bank of the River Tyne, six miles west of Newcastle and had a river frontage of 1100 sq. yd., together with extensive railroad sidings. Equipment included 12 acid open-hearth furnaces of 40 tons each and a modern rolling mill plant for turning out boiler and ship plates, spring steel and bars.

Founded in 1810, the firm has had a high reputation both for quality of its plates and for speed of delivery. What is probably the oldest railroad in England—Wylam Wagonway—passes through the works. On this for many years ran the "Puffing Billy," one of the earliest locomotives ever built.

Our contemporary refers to the closing of these works as "Further evidence of the grave situation in which the iron and steel industries find themselves. It is to be hoped that the works very shortly will be reopened for some other industry, for the dismantling of the present plant would be a severe loss to the 10,000 inhabitants of the village of Newburn."

Employment Gains in Illinois

Increased industrial activity in Illinois resulted in a gain of 1.4 per cent in factory employment for August as compared with July. The gain for all industries, as indicated by the State bureau of labor statistics, was 1.5 per cent. Building showed a gain of 10 per cent, and the resumption of coal mining by a few operators, who have signed with the United Mine Workers, resulted in an increase of 10 per cent in coal mine pay rolls. Road construction showed a gain of 17.9 per cent. Industries that added workers to their forces in August include metal-working plants, manufacturers of heating and ventilating apparatus and makers of automobiles and accessories.

The Ford Motor Co. will use a Semet-Solvay acid washer for the light oil and benzol recovery plant of the by-product coke ovens at Dearborn. The function of the washer will be to wash out impurities from the crude benzol liquor by means of a sulphuric acid bath. The process separates such substances as phenol and sulphur while preserving for further refinement the elements desirable for making high-quality automobile fuel.

Organize Newton Die Casting Corporation

The Newton Die Casting Corporation has been formed to take over the business and assets of the die casting division of the National Lead Co., New York, and the Marf Machine & Die Casting Co., Brooklyn. At present the two plants will be operated as separate units in their present locations. A considerable expansion program is said to be planned and in the near future the new corporation will be housed in a modern plant. W. G. Newton, for many years president of the Marf company, will be president and general manager of the new organization.

Czechoslovakia Reduces Duties On Metal Products

WASHINGTON, Sept. 20.—By a government decree effective recently the Czechoslovakian autonomous rates of duty on a number of items have been reduced, according to a report received by the Department of Commerce from the American Commercial attaché at Prague. Among the articles affected are the following: bloom iron; billets of cast and puddled iron; iron and steel bars and rods; iron and steel plates and sheets coated with various metals of varying thickness; lead and tin plates and sheets; lead and tin rods, bars and wire; lead pipes and cylinders; products of aluminum and its alloys, also combined with common or fine metals.

To Hold Safety Conference at Columbus

A safety conference and exhibit will be held at Columbus, Ohio, Nov. 9 and 10, under the auspices of the Industrial Commission of Ohio. A tentative program shows there will be sectional meetings on such divisions of the industry as metals and foundries, and mining and quarries. J. M. Woltz, safety director of the Youngstown Sheet & Tube Co., Youngstown, is chairman of the metal section. It is expected that in connection with the conference there will be exhibits of posters, models of safety devices, and the like.

Rates on Pipe and Tanks in Southwest Declared Unreasonable

WASHINGTON, Sept. 20.—Holding that rates on wrought iron and steel pipe, pipe fittings and steel tanks, knocked down, in carloads, from and to points in Louisiana, Oklahoma, Texas and Kansas are unreasonable, Examiner Frank C. Weems in a tentative report to the Interstate Commerce Commission last week declared the rates should be based on the scale prescribed in the decision in the consolidated Southwestern proceeding. He also recommended award of reparation to the complainants, including the Tidal Oil Co., the Great Southern Oil Co. and others.

Mueller Salesmen Meet on Own Automatically Watered Golf Course

The fifth annual salesmen's meeting of the Mueller Brass Co., Port Huron, Mich., was held Sept. 6 to 9 at the Mueller Golf and Country Club of that city. Twenty-five sales representatives from all parts of the country attended the conference. The golf club belongs to the Mueller company but is open to the general public. Copper pipe has been laid to each green and disappearing sprinkler heads of brass have been installed in the green so that all greens may be watered automatically. The sprinkling system is supplied with water by a pump capable of providing water at 100-lb. pressure, and all of the greens can be watered at one time in about 15 min. The copper pipe and brass sprinkler heads were manufactured by the Mueller company.

Methods of rating electric welding equipment, to be used as a basis of guarantees by the maker, will be standardized by the American Engineering Standards Committee.

Machine Tool Show Gets Under Way

Cleveland Exposition a Mecca for Machinery Users —
Automotive Production Meeting Also Well Attended

CLEVELAND, Sept. 20.—Large attendance and active interest marked the first two days of the National Machine Tool Builders' Exposition, which opened Sept. 19 in the West Annex and Arcade of the Public Auditorium. If the registration of the opening days continues throughout the week, the success of the exposition will without doubt exceed even the most optimistic expectations. The exposition will continue through Friday, Sept. 23.

Not only is this exposition unprecedented as to the total number of machine tools displayed by the 175 exhibitors, but also as to the wealth of equipment of entirely new or improved design. Machines of every class and type are to be seen in actual operation, and the entire exposition has the appearance of a gigantic machine shop engaged in a wide variety of metal-working operations ranging from the closest precision work to manufacturing on a record production basis.

This exposition, the first to be held under the auspices of the National Machine Tool Builders' Association, is coincident with the twenty-fifth anniversary of the association's first annual meeting, held also in

this city, Oct. 14 and 15, 1902. Like the exposition now being held, the first meeting was regarded as an event of some importance, reference to it in *THE IRON AGE* of Oct. 15, 1902, being to the effect that it was "the largest gathering of machine tool builders ever held in this country." The members attending, as listed in *THE IRON AGE*, totaled 30!

Decision to inaugurate its own exposition was made by the machine tool builders' association at a meeting in Providence, R. I., May 6 and 7, 1926. The carrying out of this decision, the present mammoth aggregation of the very latest developments in machine tool engineering, is regarded as the most important single accomplishment of the association since its beginning in 1902.

The exposition committee is headed by J. Wallace Carrel, Lodge & Shipley Machine Tool Co., Cincinnati. Other members are: P. E. Bliss, Warner & Swasey Co., Cleveland; H. W. Dunbar, Norton Co., Worcester; O. B. Iles, International Machine Tool Co., Indianapolis, and E. J. Kearney, Kearney & Trecker Corporation, Milwaukee.

Automotive Production Meeting

THE Cleveland sessions of the production meeting of the Society of Automotive Engineers, held at the Hotel Winton, Sept. 19 and 20, during the week of the Machine Tool Builders' Exposition in the same city, covered mornings and evenings, the afternoons being left open for visitors to attend the exposition.

With E. P. Blanchard, Bullard Machine Tool Co., Bridgeport, Conn., as chairman, the opening session featured papers on "Net Profit from Modern Machine Tools," by George T. Trundle, Jr., president Trundle Engineering Co., Cleveland; and on "Manufacturing Methods Used in Building the Wright Whirlwind Engine," by Lee M. Beatty, Wright Aeronautical Corporation, Paterson, N. J. Because of Mr. Beatty's absence, his paper was read by A. R. Fors, production engineer Continental Motors Co., Detroit.

Mr. Beatty's paper was outstanding because of the noteworthy performance of the Wright engine, the J-5, in the transatlantic and transpacific flights of Lindbergh, Chamberlin, Byrd, Maitland, Smith, Goebel, Jensen and Brock, this paper was of timely interest.

The great care taken in the production of the various parts of this engine was forcefully revealed in the presentation of the paper, which was illustrated by a number of lantern slides. A very important phase of the manufacture is the rigid inspection system em-

ployed, numerous tests and inspections being made of each part in process, and of the engine after it is assembled. Test pieces formed integrally with castings and forgings are subjected to tensile and impact tests before and after heat treating, and chemical tests are made to determine their conformity to specifications. Crankcases, cylinders and tubes are tested by pneumatic pressure, and pistons by hydraulic pressure. Rough and finish parts are tested for defects such as seams and cracks by submerging them in acid solutions. The testing and machining of several parts, including the crankcase casting, cylinder head, cylinders, cylinder barrels, pistons, valves, crankshaft, gears and connecting rods were described and illustrated. Approximately 85 operations are necessary to complete a crankshaft, and in nearly every operation two shafts are worked upon at one time. One master and eight articulating connecting rods are used in each engine. Eighty-seven machining operations are required to make one master connecting rod.

A systematic procedure is followed in the manufacturing departments. Parts are manufactured in accordance with operation sheets, which are carefully made to assure proper coordination of production. Jigs and fixtures are used extensively to assure interchangeability as well as for efficiency in production. The per-

"BACK of the amazing array of productive tools and processes that now fill the land stands a group of tools that are in a class by themselves. These may be called the 'Master Tools of Industry,' since the production of all other tools and processes, in the construction of which metal working is a necessity, depends upon the possession of some or all of these tools. This group consists of the lathe, the planer, the drilling machine, the boring mill, the milling machine and the grinding machine, with their several modifications and derivatives. They constitute the group commonly known as machine tools. . . . This group of tools is worthy of special notice for they are the basic implements and accurate machine construction of all kinds depends absolutely upon them."—From an address by Dr. Dexter S. Kimball, dean of the College of Engineering, Cornell University, Ithaca, N. Y., on "The Development of Machine Tools," made before the Philadelphia local section of the A.S.M.E., Feb. 27, 1923.

sonnel of the manufacturing department, to whom, it was said, no little credit is due for the success of the Whirlwind engine, is comprised of highly skilled operators who are impressed with the importance of their work.

Urges Reserve for Purchase of Needed Tools

Mr. Trundle's paper emphasized the necessity of reducing manufacturing costs to create wider markets and to meet competition without a loss. This has enlarged the importance of keeping a plant well equipped with modern machine tools. The subject has been neglected, not necessarily because the need of modern tools has not been brought to the attention of management, but because in most cases the ready cash to pay for them has not been at hand.

It is suggested that necessary funds be made available by keeping the reserve for machine tools in liquid condition. The desirability of having some formula particularly applicable for the replacement of obsolete machine tools was stressed. It is urged that some national organization study the subjects of reserve for depreciation and budgets for new equipment. "Mechanical equipment and methods should be audited constantly," said Mr. Trundle, "and when these audits reveal losses they should be corrected."

Pays Tribute to Production Engineer

"Integrated Production," by E. P. Blanchard, advertising and assistant sales manager, Bullard Machine Tool Co., Bridgeport, Conn., was another paper received with interest. It is printed at length elsewhere in this issue. Among those discussing the paper were J. D. Seeger, General Electric Co., and Ernest F. DuBrul, who characterized the paper as a contribution to economic literature. A. H. Frauenthal, Chandler Motor Car Co., Cleveland, presided at this meeting.

The contribution of power and machinery to the high standard of living, and to the dignity of American labor, was interestingly outlined by Charles M. Ripley, General Electric Co., in an address at the evening session. His address was illustrated by more than 100 slides.

CANADA'S FIRST POWER SHOW

Exhibits by 300 Manufacturers—Attendance Put at 7000

SEVERAL thousand men in the mechanical engineering fields—one estimate puts the number at 7000—were in attendance at the Steel and Power Show, held at Varsity Arena, Toronto, Aug. 31 and Sept. 1 and 2. Campbell Bradshaw, the general chairman of the exposition committee, puts the value of the machinery and other products shown at \$500,000, and 300 manufacturers were represented in the booths. It was Canada's first exposition of the sort, and its success is noteworthy in view of various counter-attractions, including that at Machinery Hall of the Canadian National Exhibition. The attendance was thoroughly representative of Ontario and Quebec, and included a considerable number of executives and engineers from other Canadian provinces, as well as from the United States and Great Britain.

The unique feature of the arrangements was the rental of four university residences with capacity for the accommodation of 500 visitors. The character of the attendance was noteworthy, admission being by invitation bearing the name, position and address of the visitor. The result was that those examining the exhibits had a genuine interest in the equipment shown.

Robert W. Angus, professor of mechanical engineering, University of Toronto, declared the show officially open at a meeting held on the afternoon of Aug. 31. He was followed by Dr. F. C. Langenberg, research engineer, U. S. Army, Watertown Arsenal, Watertown, Mass., who had for his subject "Where Are We Going in Metallurgy?" Other speakers at the first day's session were F. A. Combe, Montreal; L. T.

Rutledge, associate professor of mechanical engineering, Queen's University, Kingston; M. Barry Watson, director of engineering, Central Technical School, Toronto; F. S. Collings, mechanical engineer, Sargent & Lundy, Inc., Chicago; Frank L. Eidmann, associate professor of machine design, school of engineering, Princeton University.

At a welding session the speakers were J. F. Lincoln, Lincoln Electric Co., Cleveland; S. W. Miller, Union Carbide and Carbon Research Laboratories, New York; Joseph Cave, vice-chairman Canadian Section, American Welding Society, and welding adviser, Davenport Works, Canadian General Electric Co., Toronto, and T. Holland Nelson, T. H. Nelson & Co., Conshohocken, Pa.

At other technical sessions the speakers included C. A. Thinn, research engineer, C. A. Dunham Co., Chicago; J. O. Twinberrow, designing engineer, Babcock-Wilcox & Goldie-McCulloch, Ltd., Galt; A. N. Otis, industrial heating engineer, General Electric Co., Schenectady, N. Y.; Melvern F. Thomas, consulting engineer, Toronto; O. W. Ellis, research metallurgical engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; L. M. Arkley, professor of mechanical engineering, Queen's University; M. P. Whelen, industrial heating engineer, Toronto hydroelectric system; W. S. Quigley, president, Quigley Co. of Canada; E. A. Allcut, associate professor of mechanical engineering, University of Toronto; John Howe Hall, research engineer, Taylor-Wharton Co., High Bridge, N. J.

Luncheons were held at the King Edward Hotel, and among the speakers were B. Stuart McKenzie, Ottawa, secretary of the Canadian Engineering Standards Association, on "What Standardization Can Do for Industry," and R. B. Morley, Toronto, general manager of the Industrial Accident Prevention Associations of Ontario, on "Accident Prevention Profitable to Industry."

At a banquet on Saturday night, Sept. 3, at which General Chairman Bradshaw presided, Mr. Bradshaw was presented with a purse of gold by F. A. W. Taylor, Davenport works, Canadian General Electric Co., on behalf of the sponsors of the show.

Electric power, gas and compressed air were called into service to operate the many working exhibits, which included steel-treating furnaces, machine tools, pneumatic tools, pumps, blowers, fans, etc. Equipment was shown in many cases under actual operating conditions.

Accept Leadership in Standardization of Electric Motor Frames

With the recent acceptance by the American Society of Mechanical Engineers and the National Electrical Manufacturers Association of joint leadership in the development of standards relating to certain important dimensions governing the interchangeability of electric motors of different makes, this standardization project has made a forward step, according to an announcement by the American Engineering Standards Committee, New York.

The National Machine Tool Builders Association, which found the diversity in motor dimensions a problem of particular difficulty in their industry, filed the original request to have the subject taken up by the American Engineering Standards Committee. A conference, to which all parties interested in this subject were invited, was called by the latter body, at which the following scope for the work was recommended:

- a.—a series of standard dimensions for the distance from the base to center of shaft (shaft height).
- b.—a series of standard distances between bolt holes, at right angles to the shaft.
- c.—a series of standard distances between bolt holes, parallel to shaft.
- d.—certain definite combinations of a shaft height with any or both of the distances between bolt holes as mentioned under (b) and (c).
- e.—maximum diameter and length of the motor.

National Metal Week at Detroit

Steel Treathers, with Non-Ferrous Metallurgists, Automotive Engineers and Welding Experts, Hold Imposing Convention and Exhibition

DETROIT, Sept. 20.—In what is designated as National Metal Week, metallurgists, steel treathers and steel makers, as well as others interested in the metal industries, are gathered here in large numbers. Besides the ninth annual convention of the American Society for Steel Treating, there are also technical meetings of the Institute of Metals, the American Welding Society and the Society of Automotive Engineers. In addition, there are gatherings of drop forgers, the Concrete Steel Institute and various technical society committee meetings. The convention as a whole is the largest of its kind ever held and is imposing in its personnel and importance.

Exposition is Imposing

Besides these meetings at the Hotel Statler and the Book-Cadillac, there is the mammoth Steel and Machine Tool Exhibition at Convention Hall, a convenient distance from the hotels. Due to splendid organization, this was ready to start on Sunday, Sept. 18. It is impressive in its completeness and method of display. The 93,000 sq. ft. of exhibition space are completely filled. Already the attendance has been equal to optimistic expectations. The displays by steel companies are striking, as are also all presentations of heat-treating equipment. The welding display is also notably interesting. A more detailed account will be published Sept. 29.

Over 70 Papers at Technical Sessions

Sessions on heat treatment and on testing were held by the steel treathers yesterday. Today has been featured by largely attended sessions on steel melting practice this morning and on tool steel this afternoon. Radclyffe Furness, Midvale Co., Philadelphia, presided at the steel session and Dr. John A. Mathews, Crucible Steel Co. of America, at the tool sessions. For the ten sessions this week, Sept. 19 to 23, there are 44 papers scheduled. For the sessions of all four societies, there are over 70 papers: A. S. S. T., 44; Institute of Metals, 10; S. A. E., 6; and A. W. S., 12. Some of the features of these programs will be reviewed in THE IRON AGE, Sept. 29.

The Howe Medallist

W. P. Sykes, research metallurgist Cleveland Wire Works, Incandescent Lamp Division of the General Electric Co., Cleveland, will be awarded the Howe medal this year at the banquet, Thursday evening. This is in recognition of his paper at last year's Chicago convention on the iron-molybdenum diagram.

New Officers

The nominating committee at its meeting yesterday recommended for the society's officers for 1928 the following:

President: F. G. Hughes, New Departure Co., Bristol, Conn.

Vice-President: Dr. Zay Jeffries, research metallurgist Aluminum Co. of America, Cleveland.

Treasurer: M. J. Watson, metallurgist Hupp Motor Co., Detroit.

Directors: T. E. Barker, Chicago Chapter, and W. H. Phillips, Pittsburgh Chapter, succeeding R. G. Guthrie, Chicago, and Hyman Bornstein, Moline, Ill.

These officers are not formally elected until later. They assume office on Jan. 1.

Entertainment Features

Edgar Guest, Detroit's famous poet, is to be toastmaster at the annual banquet at the Hotel Statler, Thursday evening. R. M. Bird, Philadelphia, past-president, will be given the past-president's medal, and Mr. Sykes will be formally presented with the Howe

medal. Honorary membership will be conferred on Dr. W. R. Whitney, General Electric Co., Schenectady, N. Y., and on Dr. C. F. Kettering, General Motors Co., heads of the research departments of these two companies. Both will make addresses, with the latter the principal speaker of the evening. Arrangements have been made by the General Electric Co. to listen to the Tunney-Dempsey encounter at Chicago after the banquet. The other technical societies participate in this banquet as well as in other social functions.

Tonight at 11 o'clock over 5000 members and guests will attend the new State Theater where a vaudeville and special program will be put on. The Ford Motor Co.'s band will entertain as the crowd assembles in the theater.

A "grand Arabian ball" is scheduled for tomorrow evening at the Statler, the decorations being made to fit the name.

Dr. Zay Jeffries, treasurer of the society, will deliver the second Campbell memorial lecture tomorrow, Wednesday, morning, when he will discuss hardening theories of steel and metals, reviewing the work of the late Prof. E. D. Campbell and presenting some recent results of his own work and that of his associates.

President J. Fletcher Harper gives a breakfast tomorrow morning at the Hotel Statler to the chairmen and secretaries of the various chapters.

Convention Next Year at Philadelphia in Week of Oct. 8

The convention and exhibition for 1928 will be held in the week of Oct. 8 at Philadelphia. The exposition will be known hereafter as the National Metal Exposition. The change from September to October is made to avoid conflict with similar gatherings.

The following members of the Philadelphia chapter have been appointed to represent the board of directors of the A. S. S. T. on the Philadelphia convention: R. M. Bird, past-president, J. M. Adams, Midvale Co., chairman Philadelphia chapter, and W. B. Coleman, who is chairman of the meetings and papers committee.

The steel treathers semi-annual technical meeting is scheduled for Montreal Feb. 16 and 17.

Conference on Engineering Materials in Berlin

A conference on engineering materials is to take place in Berlin, Germany, from Oct. 22 till Nov. 13. The sponsors of this convention are the German engineering associations, supported by various German industrial organizations. The program contains about 200 papers to be read at the Technical University of Charlottenburg. There will also be an exhibition of engineering materials arranged in the Neue Ausstellungshalle on the Kaiserdamm, dealing with iron and steel, non-ferrous metals and electrical insulation materials.

Particulars may be obtained from the Geschäftsstelle der Werkstofftagung, Berlin, NW7, Ingenieurhaus.

Welding Conference at University of Minnesota in October

A conference of the welding industry is to be held at the University of Minnesota, Minneapolis, on Oct. 20, 21 and 22. Prof. S. C. Shipley, acting head of the mechanical engineering department of the College of Engineering, is in charge of the program.

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This Issue in Brief

Output per worker has increased almost 50 per cent in 21 years. The aggregate increase is equal to the output of 2½ million men, or almost one-third of the entire industrial population. That this has not caused unemployment is striking evidence of the stimulating effect of increased individual production.—Page 785.

Body builder buys steel on "satisfaction" rather than "specification" basis. Budd lets the steel maker bear the burden of providing an acceptable material. Regular tests are not conducted, but when trouble develops, a thorough investigation is made, and if the sheets are defective the steel maker is called upon to right the trouble.—Page 781.

Increases blast furnace output 50 per cent and cuts coke consumption 15 per cent by use of steeper inwalls and enlarged top. Sloss-Sheffield official believes marked improvement is due to better distribution of the stock, which permits an easy upward movement of the gases.—Page 782.

Difference in efficiency of electric and gas furnaces depends upon amount of heat carried away in the waste products of combustion, says engineer. If the products of combustion leave at room temperature then the efficiencies are identical. Electric furnace secures its maximum advantage over fuel-fired furnaces in the higher range of temperatures, he declares.—Page 789.

Stick to the standard thread sizes and save money and trouble. When designers of equipment and tools having threaded parts specify standard thread sizes, not only are standard taps, dies and gages immediately available, but suitable specifications are easily provided.—Page 792.

Watch your sand, if you want to keep defective castings down to the minimum. When the sand is "off" some foundrymen go to the expense of "sweetening" it with high-priced material, and tighten up on general supervision. There is an immediate reduction in losses. Very likely the same careful attention, without the high-priced material, would accomplish the desired results.—Page 793.

Instead of selling your tar, why not distill it yourselves and make a handsome profit?, engineer asks coke producers. It is economically wasteful to burn the tar as fuel, without taking out the creosote oil. A good market for the oil exists, and a plant producing 500,000 gal. of tar per month should be able to make \$120,000 a year from this operation.—Page 794.

No pit needed by this new car dumper. It rolls its burden up an incline and dumps contents at an elevation considerably above the tracks. Twenty cars an hour is its capacity.—Page 796.

Is the secret of making high-silicon iron alloys ductile about to be discovered? The usefulness of these corrosion-resisting alloys is reduced by their brittleness, but Corson finds that up to 9 per cent silicon can be ductilized by slow annealing, and also that 14.4 per cent alloy becomes malleable under certain conditions.—Page 798.

How stamping manufacturers can determine whether the steel will form satisfactorily. It has been Budd's experience that trouble in forming is never experienced when the elongation limits in test strips of 2-in. gage length are 37 per cent with rolling and 34 per cent against rolling; in 8-in. gage length, 25 per cent with rolling and 25 per cent across rolling.—Page 781.

Recovery in pig iron prices depends on steel market, says Dr. Haney. While pig iron prices are at bottom levels, he sees no hope for a general advance until steel leads the way.—Page 807.

Huge washing machine launders 7000 sheet metal auto parts per day. Pontiac parts are hung on a monorail conveyor and move 100 ft. through three high-pressure washing zones, one a washing compound and two clear rinse water sprays; thence to drying oven.—Page 788.

Foundries should keep an accurate record of the cause of defective castings. There are three general sources of loss: metal, equipment, and sand. Don't confuse mistreatment of the metal with faulty metal, and be sure to make a daily test of the sand. The simple bottle and vibrator test will do.—Page 793.

The production engineer should find the "peak of economy," and then look a little beyond it, says machine tool builder. In working toward greater profit per work-unit, every stage in quantity production has its own limits of equipment and methods. When the peak of economy is passed returns diminish. But allowance should be made for future expansion.—Page 800.

Ford spends \$15,000,000 on machine tools in equipping plants for new model. Aggregate expenditures incident to getting ready for new manufacturing schedule are put at \$22,000,000.—Page 809.

Center of industry has moved only 75 miles in 18 years. It is now at a point about 50 miles southeast of Chicago. The pace of industry westward is so leisurely that it has traversed only one-sixth of the width of the country in a century.—Page 816.

ESTABLISHED 1855

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Steel and Other Centers

AN Interior Department announcement puts the center of industry in the United States about 50 miles southeast of Chicago. The determination was made by the Geological Survey on the basis of capacity of steam engines, steam turbines, water wheels and internal combustion engines installed in manufacturing plants and public utility power plants, the latter being given twice the weight of the former. In 18 years this center moved only 75 miles, in a west by south-west direction. The pace was such as to traverse only one-sixth of the width of the country at that latitude in a century.

One has good reason, therefore, to discredit the argument that the center of steel manufacture should move westward because the West is growing more rapidly than the East. The difference is too slight to amount to anything in connection with the manufacture of steel. In the 18 years in which the industrial center moved 75 miles the steel making capacity of the country doubled. Steel plants cannot be moved, but for building new capacity the best place is selected. Assembly of raw materials is the chief consideration, for the raw materials weigh several times as much as the finished product. The same principle applies in more simple form to Portland cement manufacture, in which there are entirely separated districts, eight of which each produce more than 10,000,000 barrels a year.

The center of population of the United States is about 170 miles south of the center of industry while the geographical center lies 640 miles west by southwest of the center of industry. Manufacturing is thus perfectly balanced with population in an east and west direction while it is not out a great deal in the north and south direction. There is a closer agreement than might be imagined. That the center of population should be far from the geographical center is of course readily recognized.

If the steel industry were to migrate it would do so by the building of new plants. Neither the

profits nor the demand are such as to encourage the building of new plants, which from necessity must be in large individual units. Expenditures are, however, heavy, in improving plants so that quality is enhanced and cost is reduced, while largely as an incident the capacity does grow somewhat year by year.

The center of steel production is far east of the center of industry and the distance between them will not change to any noticeable extent while present conditions prevail. Only important development of new sources of raw materials would alter the case.

There is another point in this matter of the localities of steel production being well settled. That is that the consumption of steel has been trending into smaller and smaller things, whereby the cost of the steel becomes a small part of the price paid for the article by the ultimate consumer. The freight on steel is a great consideration to manufacturing competitors but it plays an insignificant part in determining the consumption in different sections of the country.

There are exceptions to this trend of steel going into smaller things, but they do not alter the general principle. The automobile industry has become a great steel consumer, but that would influence steel manufacture to move north rather than west. Bridges and other construction projects take much larger individual tonnages than formerly; but points of consumption cannot be forecast in a way to influence construction of steel-making capacity.

NO other steel producing country in Europe has been increasing its output of pig iron and steel at any such pace as Germany has shown this year. In 1926 Germany made pig iron at the rate of 791,100 gross tons per month; to June 1, this year, the average was 1,042,300 tons per month, an expansion of over 30 per cent. In 1926 the German steel production was 1,012,500 tons per month. This had expanded by the end of May to 1,293,900 tons per month, an increase of 28 per

cent. The figures not only reveal Germany's rapid economic recovery but also explain in part why German producers can expand their exports and cause keen, and in some cases destructive, competition with other European nations. Production is close to pre-war volume, when the country's capacity included Lorraine, and exports are second only to France. The combined competition from these two countries, added to that of Belgium, is making it difficult for British sellers to hold even their own domestic business.

Economy in Fuel Burning

PUBLIC utility power plants in the United States burned last year more than 41 million net tons of coal, 9.4 million barrels of fuel oil and 53 million cubic feet of gas in producing 47.6 billion kilowatt-hours of electric energy. For the whole United States, the coal-burning equipment produced each kilowatt-hour on 1.94 pounds of coal. But the New England States obtained the result on 1.74 pounds of coal. Oil-burning equipment for the country averaged 243 kilowatt-hours for each barrel of oil. But both New England and the East North Central section obtained 300 kilowatt-hours from each barrel. Gas-burning equipment used 22.1 cubic feet of gas for each kilowatt-hour, but the Pacific States obtained their results on 17¼ cubic feet of gas.

If the country as a whole had obtained its power on the same relative consumption of fuel as the best of the large districts enumerated above, there would have been a saving of approximately 4¼ million tons of coal, 1¾ million barrels of oil and 11.7 million cubic feet of gas. At current rates, the saving from this more economical fuel consumption would aggregate nearly \$25,000,000.

Some of the best plants produced their results on not far from one-half the fuel consumption per electric unit required by the average. It is estimated that the coal conservation alone, if all the power had been produced at the best rate, would have been \$75,000,000.

Teaching Employees the Three R's

INDUSTRIAL establishments which have undertaken programs for the education of employees are finding that if their classes are to be broadly successful means must be provided to teach the three R's to a group of very considerable size. For the most part, let it be noted, this group is made up of young men who are native born and the product of American public schools.

To take a case in point, among the classes which have been conducted for some years by the Norton Co., Worcester, Mass., are those in commercial correspondence and applied mathematics. They have had a large measure of success, but too many instances have come to light where students were insufficiently grounded in the elements of grammar and arithmetic. The Norton Co. uses the University Extension courses conducted by the State of Massachusetts. The educators who supervise this excellent system had already discovered this weakness and elemental

courses had been provided. It was found that for the past two decades or longer grammar school courses have been so crowded with subjects that the pupils could not be given thorough training in grammar and arithmetic. Too much time would be required.

The result is that young people who must end their education at an early age lack the knowledge which pupils used to get in their grade-school years. And now that the State has provided evening courses, not only persons who could not finish the grammar school course but some who finished but with indifferent results may have a second chance. The new class in English at the Norton plant will start with thirty pupils. They will be taught grammar just as it is taught to twelve-year-old boys.

From the study of English by earnest men in evening classes the results have been highly beneficial, as many men now on their way up the industrial ladder can testify. To be able to express oneself clearly is an asset of no mean importance and without correctness of diction clearness is often impossible. Straightforward, simple English—and such English is best of all, at any rate in business—may be mastered sufficiently well, provided one has the basic knowledge of the principles of grammar. Those who supervise the correspondence of business houses often deplore the handicap under which otherwise capable men labor because they are unable to express clearly in writing what is in their minds. The value of many men with well-recognized knowledge of a business is much impaired because they are unable to prepare adequate, easily-digested reports of their investigations and accomplishments. To remedy such weakness is a highly commendable undertaking.

Farming Can Be Made to Pay

THAT some form of farm relief legislation will pass the next Congress seems assured. It is safe to predict, however, that the debate will bring out the fact that for many of the things of which the farmer complains the remedy is in reach of the industry itself. The operation of the great Campbell wheat farm in Montana has demonstrated that even under existing conditions wheat growing is profitable. Agricultural experts agree that important economies are realizable through the consolidation of farms, through co-operative grouping for operation under a single direction, etc. Some enterprises of the latter sort are being started in Kansas.

Most individual farmers are bad managers. Even such groups of farms as individually are well managed suffer from the charges on equipment that must be provided for use during relatively few days of the year and might serve the purposes of several farms.

Such unfavorable conditions exist in almost all agricultural regions and in almost all kinds of farming, whether the latter be wheat growing, corn planting, cotton growing or the dairy farming of New England.

There is no farming region into which an intelligent business man, hailing even from the purlieus of what is generically described as Wall

Street, might not go and by the introduction of business methods put the local industry upon a profitable basis. The only question would be whether agriculture could be organized, either by consolidation or cooperation, in units large enough to make their direction worth while to men of administrative ability.

While this idea may be economically sound, sociologically it is doubtless chimerical. The rank and file of our six million farmers do not want to contemplate any such thing. They are intense individualists who want to live their own lives. They want to work as they please. They want to be careless of their equipment and let their machines rust in the fields. They want the privilege of complaining of the weather, of the markets, of the inability to hire help, and of Wall Street, by which they mean industrialists who are better managers than themselves. They want the freedom to gamble in lands and in their commodity markets, and in oil stocks, and perhaps they want the privilege of crying out for Government help when they have been unlucky in their speculations. But we suspect that in this last respect the farmers are better sports than they are said to be, and that the squealing and appealing come mostly from local money-lenders who have had to take over their liens.

We should not like to see the farms of the country acquired by corporations and picturesque individualists converted into a tenantry or into a proletariat that might easily be wrongly led. We have no fear that any such thing is ever going to happen. On the contrary the recent tendency in Europe has been toward the breaking up of large estates, although that has meant decreased efficiency. Nevertheless the farmers could do much for themselves if they would organize into groups and, while preserving the major part of their individuality, employ a superior manager to coordinate and direct their operations.

Trends in Steel Consumption

HOW many rolled steel products are in the million ton class as to annual production, and what is their sequence? Few could answer off-hand. The matter may not be important as to the position of these lines at the moment, but to trace the changes that have occurred is of interest, because they are suggestive of the future. As an illustration of these great changes, in 1887 rails stood first, and it required a combination of bars, hoops, axles, skelp and shapes to beat the rail tonnage by a small margin. Last year three of those lines individually stood above rails. In 1887 plates and sheets combined represented less than double the nail tonnage, whereas in 1926 they represented fifteen times the nail production, which was a trifle under 700,000 gross tons.

Any general presentation of steel production by commodities is open to criticism as to the division, because we have no single standard universally accepted and used. One method is by type of mill, another is by method of selling and another is by use. By reason of sheet mill and tin mill practice being slightly different, while the bulk of the tin mill product is used for one specific purpose, making containers after a light

coating of tin has been applied, sheet and tin mill products are usually regarded as quite different products. They differ less from each other in use than certain forms of pipe or tubes, or certain forms of bars, differ from each other, while on the other hand products so different as shapes and plates are used together in structural steel work.

Taking the product of sheet mills and tin mills together, it stands at the head of the list, and there are eight products in the million ton class. Separating them, sheets are second in the list and tin mill product is eighth, the whole list of million ton products then becoming nine. By the latter classification the list, on the basis of 1926 production, is as follows: *

Million Ton Rolled Products			
Gross Tons		Gross Tons	
(1) Bars	5,473,836	(6) Rails	3,217,649
(2) Sheets	4,237,479	(7) Rods	2,722,032
(3) Plates	4,201,182	(8) Tin mill	2,090,395
(4) Shapes	3,911,663	(9) Strips	1,222,089
(5) Skelp	3,764,550		

The total of the nine items is 30,840,875 tons, or 87 per cent of the grand total. The other 13 per cent, 4,655,017 tons, was made up of concrete reinforcing bars, bands, hoops and cotton ties, material for seamless tubes, long angle splice bars, tie plate bars, etc., and numerous miscellaneous.

Skelp and rods are not the common articles of commerce, but are included in the table because the rolled steel production statistics weigh each commodity after its last hot rolling. Production of pipe is reported separately, and in the fourteen years for which such statistics have been presented only two showed less than 89 per cent as much pipe as skelp and only two showed more than 94 per cent as much pipe as skelp. Thus pipe instead of skelp would still be in fifth place. As to rods, they belong in the table from the production rather than the use standpoint, the applications of wire being so diversified.

Strip production was first reported for 1920. Previously, the maximum production of hoops, cotton ties and bands had been 930,719 tons, in 1916. Last year, apart from the hot rolled strips, including flats for cold rolling, there was produced 545,740 tons of hoops, cotton ties and bands.

One may generalize and form a class of steel in which the thickness is very small relative to the other two dimensions, thus including hoops, bands, strips and sheet and tin mill product. They make a total of 8,095,703 tons, or 22.8 per cent of the grand total of all rolled iron and steel, nearly double the plate tonnage, more than double the shape tonnage and nearly triple the rail tonnage. That is natural enough; but it would not have been expected a quarter century ago. By this we may expect the future to show further expansion in the use of steel in lighter forms.

A digest of trade agreements between employers and employees during the year 1926 has been issued by the Department of Labor, through the Bureau of Labor Statistics, as bulletin No. 448. Although there are few provisions common to all agreements, their general object is the same and a number of subjects of a general character are covered in more or less similar language in all agreements, such as wages, hours, overtime, arbitration and apprenticeship.

Tariff Negotiations with France

Possibility of Drastic Retaliation, to Offset French Discrimination,
Is Discussed — Embargo a Last Resort

WASHINGTON, Sept. 20.—Negotiations between the French and American Governments over the tariff issue may be prolonged. But it is understood that the American Government may make its anticipated unfavorable reply tomorrow to the proposal of the French Government that it be given reciprocal treatment if it reduces rates applying to United States exports, to the minimum basis granted to Germany and other European countries as a result of the recent Franco-German treaty. It has been made known, however, that this Government will not grant to France any lower rates than are given any other favored nation. It would be contrary to the principle of tariff making and administration of the United States to do so. Moreover, the matter of making a treaty, while resting with the President, requires confirmation by two-thirds of the Senate. It is a foregone conclusion that the Senate would not ratify such a proposed treaty, even if the administration were inclined to offer it, which it is not.

Present indications point toward a tariff impasse, if not a tariff war, though such a development will be avoided if possible. It is considered that the French Government has begun efforts looking toward tariff bargaining, which, probably, will not be engaged in by the United States Government. Claims that France is not aware of the extremely punitive provisions of the Fordney-McCumber act in retaliation for discrimination against American industries are scouted.

Punitive Measures Available

Section 317 provides the President with power, through executive order, to increase duties 50 per cent or, much more severely, to declare an embargo against imports from any country which withholds from us the preferential rates it gives to other countries. Such a drastic step hardly is looked for at present, but it might be necessary to adopt it if France does not grant the United States duties as low as those given to others.

As has been pointed out, the French general duties which apply to this country, being 4.1 times as high as those carried in the Franco-German treaty, would apply to only 10 per cent of the exports to France from the United States. Other goods exported to France would continue to take the minimum rate or be admitted free of duty. At the same time, the 10 per cent covers machinery items, as well as steel sheets, along with many other products, which go to make up an annual trade estimated at \$10,000,000. Equally important is the fact that in some of these lines this country has just begun to build up a good trade with France. Such a trade

would be hopelessly lost in favor of Germany and other European countries.

Rejection by France of the American proposal for a most-favored-nation commercial treaty has been received with great apprehension, which lends color to the possibility of serious steps of retaliation. The retaliatory provision can be applied to all imports, not alone merely to those included in the Franco-German treaty. In iron and steel the only important products brought into this country from France are cast iron pipe and pig iron, and little of the latter is entering at present. Considerable complaint has been made by domestic producers of cast iron pipe about imports of French cast iron pipe. The present duty is 25 per cent ad valorem, which could be increased one-half to 37½ per cent. Assuming the import price of cast iron pipe to be \$40 a ton, the increased duty of \$15, should it be applied, would be effective in shutting out French imports. An embargo necessarily would have that effect.

It is kept in mind that we import from France many products, such as fine textiles, silk, lingerie, cosmetics, soap, jewelry, furs, works of art, etc. Extreme doubt is expressed that France would see the American market for these products destroyed or seriously impaired in preference to negotiating a commercial treaty such as this government has proposed.

Several Complications

The issue is complicated by the fact that European countries, through cartels and attempts at dumping, are making a drive not only to wrest world trade from the United States, but also to enter its home market, to the detriment of domestic products. Further complication is seen by the refusal of countries in growing numbers to permit the Tariff Commission to inquire into costs of production from the books of manufacturers abroad. Foreign countries obviously have this privilege, but the issue is a factor in disturbing trade relations. Many members of Congress and others feel that the provision in the tariff act permitting the commission to make investigation of foreign books should be struck out.

The French customs office has stated that the old tariff rates will apply to goods having bills of lading dated before Sept. 6, the effective date of the Franco-German treaty. Department of Commerce officials point out that this is in line with the usual practice of the French Government when putting into effect administrative changes in duties, thus exempting from their application goods proved to have been en route before the changes were made effective.

NEW ZEALAND TARIFF UP

Rates Raised on Many American Products—
British Preferential Treatment Enhanced

WASHINGTON, Sept. 20.—On the heels of the Franco-German treaty, which gives Germany minimum tariff rates while giving maximum rates to the United States, comes a cable received today from Trade Commissioner Julian B. Foster, Wellington, New Zealand, saying that the recently revised tariff of the latter country increases the general duties on many articles important in the trade of the United States. At the same time the new tariff increases the margin of preference on these articles accorded to suppliers within the British Empire. Among the principal commodities on which the general import duties into New Zealand have been increased are rivets, washers, bolts, nuts, set screws, lawn mowers, typewriters, duplicating machines, elec-

trical machinery and appliances, pumps, axes, hatchets, hammers, mining machinery and hand saws.

The revision has been accomplished by increasing the general duties applying to products from all non-British sources, but leaving unaltered the preferential rates. Thus the raising of the general duties increases by that amount the preferential advantage in favor of British products.

During July the United States exported 228,472 gross tons of anthracite valued at \$2,499,457, besides 1,530,524 tons of bituminous coal valued at \$6,306,394 and 58,039 tons of coke valued at \$390,342. All of these represent marked declines from the corresponding exports of the preceding month, according to a report compiled in the Department of Commerce. Nearly all of the anthracite and coke go regularly to Canada.

Iron and Steel Markets

New Prices Aim at Stabilizing

At 1.75c. Pittsburgh, for Plates, Shapes and Bars Some Buyers Pay Less—Operations Somewhat Less Than in August—Large Rail Tonnages Pending

COMING into the fourth week of September, the steel trade finds that it must set further forward the date of the expected fall revival in demand. The scale of mill operations has not increased and September ingot production, it is now indicated, will fall below that of August.

Steel works in Pittsburgh and nearby districts are now running at about 60 per cent of capacity, as against 65 per cent for the first half of the month, and the Chicago district is holding close to the 60 per cent rate of the past two weeks. The Steel Corporation's average for all districts is slightly under 65 per cent.

Quite unexpectedly the Carnegie Steel Co. announced late last week a revision of prices on plates, shapes and bars to 1.75c., Pittsburgh, for large lots and to 1.85c. for carloads or less. Several other producers are reported to have adopted the 1.75c. minimum, which for some consumers meant a reduction of \$1 a ton and for others whose buying was on a scale that commanded concessions, especially in plates and shapes, it was an advance.

Put forth as a stabilizing measure in a market which had developed a growing tonnage of so-called preferential business, the new price policy has yet to give proof of its ability to give a needed fillip to the situation. Under old conditions a period of hesitant buying was now and then ended when makers took a stand for a higher price after booking good orders at or slightly under the previous level. But in this instance the new prices affect buyers differently at a time when many are even more strictly limiting their orders than in the summer months.

Rail business is coming forward at about the same time as last year and in a number of cases for larger amounts, as heavier rails are being taken. The Pennsylvania inquiry is for 200,000 tons of 130-lb. rails, with option on 100,000 tons additional, and the Pennsylvania commonly exercises its options. At Chicago the mills estimate that 700,000 tons are now in sight, and requirements for 1928 may easily run to 2,500,000 tons.

The Santa Fe order is expected to reach 145,000 tons. For the Louisville & Nashville 66,000 tons has been placed with the Alabama mill.

Bids on 25,500 tons of plates, shapes and bars for the Pennsylvania Railroad, to be opened Sept. 30, will show how the mills stand on the 1.75c. Pittsburgh price. On Oct. 4 bids will go in for 11,000 tons of steel, chiefly plates and shapes, for two cruisers at the Mare Island and Puget Sound yards.

Several large automobile companies have just put out inquiries for their fourth quarter sheets and strip steel. Purchases are likely to be less than for that period last year. The steel companies have

sharply revised their estimates of the Ford tonnage for the last quarter, their expectation now being that the new model will not much anticipate the January show in New York.

Construction work still makes the best showing on the score of volume. Bookings of fabricated structural steel last month brought the amount for eight months to 1,803,060 tons, or 3½ per cent above the heavy sales for the like period last year.

The past week's awards were 27,000 tons, of which the largest was a woman's club building in New York requiring 5300 tons. A Government building in New York will take 3200 tons of column cores and 3000 tons of reinforcing bars, and a sewer in St. Louis calls for 5000 tons of bars.

Irregularities in sheet prices, which started with sizes and gages directly competing with hot strip, have now extended to the entire list, 2.15c., Pittsburgh, being a more common price on blue annealed, while concessions on black sheets run from \$1 to \$2 a ton.

Sales of sheets by independent makers in August amounted to 53 per cent of capacity, against 78 in July and nearly 89 per cent in August, 1926. Production engaged 80 per cent of capacity in both August and July, compared with 92 per cent a year ago. Shipments balanced production last month and there was a sharp reduction in unfilled orders.

Makers of cold rolled strips and strip sheets have made a concession in their new price basis whereby the minimum of 3c. applies to three tons and over, instead of 18 tons and over as heretofore.

Producers of pig iron have had some success in stiffening prices on sales of small lots, but competition is still keen for sizable tonnages. A New Jersey melter has bought 1000 tons of foundry iron at a price figuring back to \$18.75 at a nearby furnace, or 25¢ a ton below previous quotations. The pressure of steel company furnaces to sell their surplus iron is reflected in a second water shipment from Cleveland to Chicago. The only large individual sale of the week was 6000 tons of basic iron to a consumer in eastern Pennsylvania.

American steel companies which buy their ferromanganese are interested in the effort to get British and some other producers together on a higher price, as reported in our London cable.

For the first time in more than three months, a decline is recorded in THE IRON AGE finished steel composite price. It is now 2.346c. a lb., in place of the 2.367c. of the preceding fourteen weeks. It is still above the low for the year (2.339c.), reached in April, but well below the level of one year ago, 2.439c. The pig iron composite price remains for the second week at \$18 a gross ton.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Sept. 20, 1927	Sept. 13, 1927	Aug. 23, 1927	Sept. 21, 1926
No. 2, fdy., Philadelphia...	\$20.26	\$20.26	\$20.76	\$21.76
No. 2, Valley furnace.....	17.50	17.50	17.50	17.50
No. 2, Southern, Cin'ti....	20.94	20.94	20.94	24.19
No. 2, Birmingham.....	17.25	17.25	17.25	21.00
No. 2 foundry, Chicago*...	19.50	19.50	19.50	21.00
Basic, del'd eastern Pa....	20.00	20.00	20.00	20.75
Basic, Valley furnace.....	17.00	17.00	17.25	17.50
Valley Bessemer, del'd P'gh	19.76	19.76	20.26	20.26
Malleable, Chicago*.....	19.50	19.50	19.50	21.00
Malleable, Valley.....	17.50	17.50	17.50	17.50
Gray forge, Pittsburgh...	18.76	18.76	18.76	18.76
L. S. charcoal, Chicago...	27.04	27.04	27.04	29.04
Ferromanganese, furnace.	90.00	90.00	90.00	88.00

Rails, Billets, etc., Per Gross Ton:	Sept. 20, 1927	Sept. 13, 1927	Aug. 23, 1927	Sept. 21, 1926
O-h. rails, heavy, at mill.	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	33.00
Bess. billets, Pittsburgh...	33.00	33.00	33.00	35.00
O-h. billets, Pittsburgh...	33.00	33.00	33.00	35.00
O-h. sheet bars, P'gh....	34.00	34.00	34.00	36.00
Forging billets, P'gh....	39.00	39.00	39.00	40.00
O-h. billets, Phila.....	38.30	38.30	38.30	40.30
Wire rods, Pittsburgh....	43.00	43.00	43.00	45.00
Skelp, grvd. steel, P'gh., lb.	1.75	1.80	1.80	1.90

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.07	2.12	2.12	2.22
Iron bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh....	1.75	1.80	1.80	2.00
Steel bars, Chicago.....	1.90	1.90	2.00	2.10
Steel bars, New York....	2.09	2.14	2.14	2.34
Tank plates, Pittsburgh...	1.75	1.80	1.80	1.90
Tank plates, Chicago....	1.90	1.90	1.90	2.10
Tank plates, New York...	2.04	2.04	2.09	2.24
Beams, Pittsburgh.....	1.75	1.80	1.80	2.00
Beams, Chicago.....	1.90	1.90	1.90	2.10
Beams, New York.....	1.95	1.95	1.95	2.34
Steel hoops, Pittsburgh...	2.30	2.30	2.30	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Sept. 20, 1927	Sept. 13, 1927	Aug. 23, 1927	Sept. 21, 1926
Sheets, black, No. 24, P'gh	3.00	3.00	3.00	3.00
Sheets, black, No. 24, Chi-				
cago dist. mill.....	3.10	3.10	3.10	3.10
Sheets, galv., No. 24, P'gh	3.85	3.85	3.85	3.85
Sheets, galv., No. 24, Chi-				
cago dist. mill.....	3.95	3.95	3.95	3.95
Sheets, blue, 9 & 10, P'gh.	2.25	2.25	2.25	2.30
Sheets, blue, 9 & 10, Chi-				
cago dist. mill.....	2.35	2.35	2.35	2.40
Wire nails, Pittsburgh....	2.55	2.55	2.55	2.65
Wire nails, Chicago dist.				
mill.....	2.60	2.60	2.60	2.70
Plain wire, Pittsburgh....	2.40	2.40	2.40	2.50
Plain wire, Chicago dist.				
mill.....	2.45	2.45	2.45	2.55
Barbed wire, galv., P'gh..	3.25	3.25	3.25	3.35
Barbed wire, galv., Chi-				
cago dist. mill.....	3.30	3.30	3.30	3.40
Tin plate, 100 lb. box, P'gh	\$5.50	\$5.50	\$5.50	\$5.50

Old Material, Per Gross Ton:	Sept. 20, 1927	Sept. 13, 1927	Aug. 23, 1927	Sept. 21, 1926
Heavy melting steel, P'gh.	\$15.50	\$15.50	\$15.50	\$17.50
Heavy melting steel, Phila.	14.00	14.00	14.00	17.00
Heavy melting steel, Ch'go	12.25	12.25	12.00	14.00
Carwheels, Chicago.....	14.25	14.50	14.50	15.25
Carwheels, Philadelphia...	15.50	15.50	15.50	17.50
No. 1 cast, Pittsburgh....	15.00	15.00	15.00	16.25
No. 1 cast, Philadelphia...	16.50	16.50	16.00	18.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.75	17.00
No. 1 RR. wrot, Phila....	15.50	15.50	15.50	17.50
No. 1 RR. wrot, Ch'go (net)	11.00	11.25	11.50	13.50

Coke, Connellsville, Per Net Ton at Oven:	Sept. 20, 1927	Sept. 13, 1927	Aug. 23, 1927	Sept. 21, 1926
Furnace coke, prompt....	\$2.85	\$2.85	\$3.00	\$3.50
Foundry coke, prompt....	4.00	4.00	4.00	4.50

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	13.25	13.25	13.25	14.50
Electrolytic copper, refinery	13.00	13.00	12.87 1/2	14.05
Zinc, St. Louis.....	6.22 1/2	6.25	6.32 1/2	7.45
Zinc, New York.....	6.57 1/2	6.60	6.67 1/2	7.80
Lead, St. Louis.....	6.00	6.00	6.30	8.50
Lead, New York.....	6.25	6.25	6.65	8.75
Tin (Straits), New York...	61.50	62.00	63.75	69.87 1/2
Antimony (Asiatic), N. Y.	11.00	11.50	11.62 1/2	15.50

Pittsburgh

Market Sentiment Grows More Conservative—Steel Output at 60 Per Cent

PITTSBURGH, Sept. 20.—Another week of unrealized hopes as to steel business is having its full effect upon market opinions, which are even more conservative than they have been. Mill and steel works operations are slipping, through the failure of the important consuming industries to increase their commitments, and while here and there will be found a steel company that is enjoying relatively full operation, the more common condition is that it is a real struggle to secure enough business to maintain the recent rate of output, and a few companies have reached a point where daily orders dictate whether capacity shall be operated. As expressed by ingot production, manufacturers in this and nearby districts are not running more than 60 per cent of capacity, a loss in the average of about five points compared with the first half of this month.

The appearance of the railroads in the market for their 1928 rail requirements would be a more positive factor if rails were the product of several instead of a few companies and if the rails had to be delivered promptly and meant immediate engagement of rolling mill capacity. Rail tonnage is backlog winter rolling business, and what manufacturers need now is tonnage for shipment over the remainder of this year.

The Ford Motor Co. is not yet buying steel against its new model and that the automotive industry as a whole is not moving cars and trucks into users' hands with sufficient freedom to need much raw ma-

terial. It is a mooted question whether the failure of the Ford company to introduce its new car is holding up the motor car industry; some hold that the light sale of cars is responsible, while others argue that the Ford company is the bread and butter of so many parts makers that they do not dare venture into new business for fear that they will be suddenly called on to provide the wants of that company.

Oil country pipe requirements continue to grow smaller. There is very little life to the tin plate market, although the prolongation of growing weather has created a few extra demands for packers' cans. A seasonal letdown in building and construction is beginning to be felt, and, except for the rail inquiries, there is little sign of a revival of interest in the market on the part of the railroads.

The revision in prices on plates, shapes and bars announced late last week by the leading producer, although probably intended as a stabilizing effort, has had a rather disturbing effect upon the situation in the immediate Pittsburgh district, where the prevailing market has been well above the prices that it was indicated had been ruling in the text of the price revision announcement. It remains to be seen whether small-lot buyers who have had a price of 1.80c. during most of this quarter will now willingly go to 1.85c. on fourth quarter tonnages.

So far as prices of other finished products are concerned, the market is very uncertain, and it is no secret that sheet and strip makers are doubtful of their price positions. Cold-finished steel bars have dropped \$2 a ton.

In the primary materials, dullness bordering on stagnation is the rule. Interest in pig iron is extremely

low, and steel makers, seeing no immediate increase in plant engagements, are not taking supplies of scrap. The coal market is flat, with ample supplies for all requirements and no sign of the shortages or runaway prices that were thought likely to result from the curtailment of union mine operations and the fact that this time of the year usually brings extra demands in preparation for the winter. So light is the demand for coke for smelting iron ore that the market for furnace grade is being made by those using it for other purposes. The need of business by coke producers makes the price situation favorable to buyers.

Pig Iron.—The market is back to a carload sales basis. None of the large melters is interested, and what demand there is comes from the small consumers, who rarely buy much in advance of their immediate requirements, which seldom run to more than a carload at a time. Prices are said to be materially under the cost of production but the average buyer is not impressed by the possibility of an early advance and is not disposed to speculate. Prices are holding where they were a week ago, but, in the lack of a test through large demand, they must be called steady rather than firm.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.00
Bessemer	18.00
Gray forge	17.00
No. 2 foundry	17.50
No. 3 foundry	17.00
Malleable	17.50
Low phosphorus, copper free.....	27.50

Freight rate to the Pittsburgh or Cleveland districts, \$1.76.

Ferroalloys.—Interest is still low on the part of consumers of ferromanganese, spiegeleisen and 50 per cent ferrosilicon, whose requirements are small and whose specifications are in accord with that condition.

Semi-Finished Steel.—Some makers note slight increases here and there in the specifications for sheet bars, a result of the fact that some sheet makers either have accumulated enough business or are getting fresh orders in sufficient quantity to require more steel. The general market in semi-finished steel, however, is best described as quiet, because the general rate of operations among sheet, tin and strip mills is still low in relation to capacity. Skelp goes to a minimum of 1.75c. in the revision of plate prices announced late last week by the Carnegie Steel Co., which other producers generally have adopted. The ruling price on skelp to the largest users has been 1.80c. Occasional sales of wire rods are reported at \$43, base, but most of the shipments carry \$42, base, as few buyers were denied a chance to cover for this quarter at the latter price before the former price was named. There is no business of importance in forging quality steel at more than \$39, base.

Bars, Plates and Shapes.—Much confusion has resulted from the announcement made last week that the Carnegie Steel Co. prices had been revised to 1.75c., base Pittsburgh, for large tonnages, with a premium of \$2 a ton to be charged for small lots. This was chiefly because the statement indicated that these prices were advances. In the case of small tonnages the new prices meant an advance, but in the natural territory

of Pittsburgh and Youngstown mills the ruling price, particularly of bars, had been 1.80c. and the new price meant a decline. Naturally there was a demand for information from many customers who thought they were getting favored price treatment and concluded otherwise from the announcement, which had wide publication. When the tonnage was of a size that warranted it, 1.75c., base Pittsburgh, had been done on plates, and there is no doubt that within the Pittsburgh district there were structural steel tonnages that went on the mill books at well under 1.80c., but such bookings have been the exception rather than the rule and evidence is lacking that even as large users of bars as the makers of cold-finished steel bars were getting supplies at less than 1.80c., Pittsburgh. The new price of 1.75c. is an advance compared with what recently has been done in competitive districts on large tonnages and what the car and locomotive builders have been called upon to pay, but in a general way 1.80c. has been the ruling Pittsburgh district price. Other makers are adopting the Carnegie schedule and some of them are writing down higher-priced business to the new level to the large tonnage buyers, but there is not much evidence of success in getting small-lot business at the 1.85c. base. A test of the market is ahead in the inquiry of the Pennsylvania Railroad for 17,000 tons of plates, 7500 tons of bars and 1000 tons of shapes for fourth quarter shipment, bids for which close Sept. 30.

Wire Products.—Business has not yet shown any material improvement, but some increase in mill operations, which now range from 55 to 60 per cent of capacity, as compared with the recent average of 50 per cent, indicates an expectation of better demand and a tendency to prepare for it in rounding out mill stocks. Buyers generally are covered to the end of the month at more favorable prices than now prevail, and there is not enough demand to provide a real test of present quotations.

Rails and Track Supplies.—Contracting for 1928 supplies of standard-section rails is close at hand in view of the authorization by Pennsylvania Railroad officials of purchases of 300,000 tons. For 1927, that road ordered 250,000 tons and took out about 225,000 tons. Other Eastern roads are expected to enter the market soon. As yet no track accessory inquiries of account have reached this market, and the demand for light-section rails is moderate in keeping with the fact that the demand for coal does not yet warrant extensive additions to active mining capacity. Prices are steady on rails, but largely untested on the accessories.

Tubular Goods.—Outside of butt welded pipe, for which the demand is seasonally steady, there is little occasion for cheerfulness in tubular goods. Lap welded and seamless pipe for oil wells, if anything, is moving more slowly than recently, and line pipe business of importance is still more of a hope than an actuality. The Milwaukee maker who is furnishing the 200 miles of large outside-diameter pipe for the Moody-Seagraves interests is reported to be producing 18,000 ft. per day of electrically welded pipe and to have already started shipments. The Pennsylvania Railroad lists 160 tons of pipe in its fourth quarter steel inquiry, but railroad

THE IRON AGE Composite Prices

Finished Steel Sept. 20, 1927, 2.346c. a Lb.

One week ago.....	2.367c.
One month ago.....	2.367c.
One year ago.....	2.439c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

High		Low	
1927	2.453c., Jan. 4;	2.339c.,	Apr. 26
1926	2.453c., Jan. 5;	2.403c.,	May 18
1925	2.560c., Jan. 6;	2.396c.,	Aug. 18
1924	2.789c., Jan. 15;	2.460c.,	Oct. 14
1923	2.824c., Apr. 24;	2.446c.,	Jan. 2

Pig Iron Sept. 20, 1927, \$18.00 a Gross Ton

One week ago.....	\$18.00
One month ago.....	18.13
One year ago.....	19.46
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

High		Low	
1927	\$19.71, Jan. 4;	\$18.00,	Sept. 13
1926	21.54, Jan. 5;	19.46,	July 13
1925	22.50, Jan. 13;	18.96,	July 7
1924	22.88, Feb. 26;	19.21,	Nov. 3
1923	30.86, Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel		Base Per Lb.
F.o.b. Pittsburgh mills.....	1.75c. to 1.85c.	
F.o.b. Chicago.....	1.90c. to 1.95c.	
Del'd Philadelphia.....	2.07c. to 2.17c.	
Del'd New York.....	2.09c. to 2.19c.	
Del'd Cleveland.....	1.94c. to 2.04c.	
F.o.b. Cleveland.....	1.75c. to 1.85c.	
F.o.b. Birmingham.....	1.95c. to 2.05c.	
C.i.f. Pacific ports.....	2.35c. to 2.45c.	
F.o.b. San Francisco mills.....	2.35c. to 2.45c.	
Billet Steel Reinforcing		
F.o.b. Pittsburgh mills.....	1.75c. to 1.85c.	
F.o.b. Birmingham.....	1.95c. to 2.05c.	
Rail Steel		
F.o.b. mill.....	1.65c. to 1.75c.	
F.o.b. Chicago.....	1.90c. to 2.00c.	

Iron		
Common iron, f.o.b. Chicago.....	2.00c. to 2.10c.	
Refined iron, f.o.b. P'gh mills.....	2.75c. to 2.85c.	
Common iron, del'd Philadelphia.....	2.07c. to 2.17c.	
Common iron, del'd New York.....	2.09c. to 2.19c.	

Tank Plates

Base Per Lb.	
F.o.b. Pittsburgh mills.....	1.75c. to 1.85c.
F.o.b. Chicago.....	1.90c. to 1.95c.
F.o.b. Birmingham.....	1.90c. to 2.00c.
Del. Cleveland.....	1.94c. to 2.04c.
Del'd Philadelphia.....	2.02c. to 2.12c.
Del'd New York.....	2.04c. to 2.14c.
C.i.f. Pacific ports.....	2.30c. to 2.40c.

Structural Shapes

Base Per Lb.	
F.o.b. Pittsburgh mills.....	1.75c. to 1.85c.
F.o.b. Chicago.....	1.90c. to 1.95c.
F.o.b. Birmingham.....	1.90c. to 2.00c.
Del'd Cleveland.....	1.94c. to 2.04c.
Del'd Philadelphia.....	1.90c. to 2.07c.
Del'd New York.....	1.90c. to 2.09c.
C.i.f. Pacific ports.....	2.35c. to 2.45c.

Hot-Rolled Flats (Hoops, Bands and Strips)

Base Per Lb.	
All gages, narrower than 6 in., P'gh.....	2.30c. to 2.40c.
All gages, 6 in. to 12 in., P'gh.....	*2.10c. to 2.20c.
Nos. 13 and 14 gage, 12 in. to 14 in., P'gh, net.....	2.30c. to 2.40c.
Nos. 15 and 16 gage, 12 in. to 14 in., P'gh, net.....	2.40c. to 2.50c.
All gages, narrower than 6 in., Chicago.....	2.40c. to 2.60c.
All gages, 6 in. and wider, Chicago.....	2.20c. to 2.50c.
Cotton ties, per bundle 45-lb. out of stock, f.o.b. Atlantic ports.....	\$1.21
Cotton ties, per bundle 45-lb. out of stock, f.o.b. Gulf ports.....	\$1.20

*Mills follow plate or sheet prices according to gage on wider than 14 in.

Cold-Finished Steel

Base Per Lb.	
Bars, f.o.b. Pittsburgh mills.....	2.10c. to 2.20c.
Bars, f.o.b. Chicago.....	2.10c. to 2.20c.
Bars, Cleveland.....	2.25c. to 2.35c.
Shafting, ground, f.o.b. mill.....	*2.45c. to 2.90c.
Strips, under 12 in., 3 tons and over, P'gh.....	3.00c. to 3.10c.
Strips, under 12 in., 3 tons and over, Cleveland.....	3.00c. to 3.10c.
Strips, under 12 in., 3 tons and over, del'd Chicago.....	3.30c. to 3.40c.
Strips, under 12 in., 3 tons and over, Worcester.....	3.15c. to 3.25c.
Stripsheets, 12 in. and wider, Pittsburgh mill.....	3.00c. to 3.10c.
Stripsheets, 12 in. and wider, Cleveland mill.....	3.00c. to 3.10c.
Stripsheets, 12 in. and wider, del'd Chicago.....	3.30c. to 3.40c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

Base Per Keg	
Wire nails.....	\$2.55
Galvanized nails.....	4.55
Galvanized staples.....	3.25
Polished staples.....	3.00
Cement coated nails.....	2.55

Base Per 100 Lb.	
Bright plain wire, No. 9 gage.....	\$2.40
Annealed fence wire.....	2.55
Spring wire.....	3.40
Galv'd wire, No. 9.....	3.00
Galv'd wire, galv'd.....	3.25
Barbed wire, painted.....	3.00
Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.	

Woven Wire Fence

Base to Retailers Per Net Ton	
F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	66.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed		Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh.....	2.15c. to 2.25c.	
Nos. 9 and 10, f.o.b. Chicago dist. mill.....	2.35c. to 2.45c.	
Nos. 9 and 10, del'd Philadelphia.....	2.47c. to 2.57c.	
Nos. 9 and 10, f.o.b. Birmingham.....	2.40c. to 2.50c.	

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	3.00c.
No. 24, f.o.b. Ch'go dist. mill.....	3.10c.
No. 24, del'd Philadelphia.....	3.22c. to 3.32c.
No. 24, f.o.b. Birmingham.....	3.15c. to 3.25c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade.....	4.15c.
No. 24, f.o.b. Pittsburgh, B grade.....	3.95c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.85c.
No. 24, f.o.b. Chicago dist. mill.....	3.95c.
No. 24, del'd Philadelphia.....	4.17c.
No. 24, f.o.b. Birmingham.....	4.00c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	3.00c. to 3.10c.
No. 28, f.o.b. Chicago dist. mill.....	3.20c. to 3.30c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.25c.
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Long Ternes

No. 28, 8-lb. coating, f.o.b. mill.....	4.20c. to 4.30c.
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Tin Plate

Per Base Box	
Standard cokes, f.o.b. P'gh district mills.....	\$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind.....	5.60

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per package, 20 x 28 in.)

8-lb. coating I.C. \$11.40	25-lb. coating I.C. \$17.30
15-lb. coating I.C. 14.45	30-lb. coating I.C. 18.75
20-lb. coating I.C. 15.80	40-lb. coating I.C. 20.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series		Base Per 100 Lb.
Numbers		
21.00* (1/4% Nickel, 0.10% to 0.20% Carbon)		\$2.90 to \$3.00
2300 (3 1/4% Nickel)		4.10 to 4.20
2500 (5% Nickel)		5.00 to 5.25
3100 (Nickel Chromium)		3.10 to 3.20
3200 (Nickel Chromium)		4.75 to 5.00
3300 (Nickel Chromium)		6.75 to 7.00
3400 (Nickel Chromium)		6.00 to 6.25
5100 (Chromium Steel)		3.10 to 3.20
5200* (Chromium Steel)		7.00 to 7.50
6100 (Chrom. Vanadium bars)		4.10 to 4.30
6100 (Chrom. Vanad. spring steel)		3.60 to 3.80
9250 (Silicon Manganese spring steel)		3.00 to 3.15
Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)		4.10 to 4.20
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)		4.10 to 4.30
Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)		4.00 to 4.25
Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)		3.10 to 3.20
Chromium Molybdenum spring steel (1—1.25 Chrom., 0.30—0.50 Molybdenum)		4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2 1/2-in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

Per Gross Ton	
Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	\$36.00 to 38.00

Track Equipment

Base per 100 Lb.	
Spikes, 7/8 in. and larger.....	\$2.80 to \$2.90
Spikes, 1/2 in. and smaller.....	2.80 to 3.00
Spikes, boat and barge.....	3.10
Tie plates, steel.....	2.35
Angle bars.....	2.75
*Track bolts, all sizes, per 100 count, 70 per cent off list	

*Chicago mill prices on large track bolts are shown in Chicago market report.

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld		Iron	
Inches	Black	Inches	Black
1/4	45	1/4 to 3/4	+11 -39
1/2	51	1/2	22 2
3/4	56	3/4	28 11
1	60	1 to 1 1/2	30 18
1 to 3	62		

Lap Weld		Iron	
Inches	Black	Inches	Black
2	55	2	23 7
2 1/2 to 6	59	2 1/2	26 11
7 and 8	56	3 to 6	28 13
9 and 10	45	7 to 12	26 11
11 and 12	53		

Butt Weld, extra strong, plain ends		Iron	
Inches	Black	Inches	Black
1/4	41	1/4 to 3/4	+19 +54
1/2	47	1/2	21 17
3/4	53	3/4	28 12
1	58	1 to 1 1/2	30 14
1 to 1 1/2	60		
2 to 3	61		

Lap Weld, extra strong, plain ends		Iron	
Inches	Black	Inches	Black
2	53	2	23 9
2 1/2 to 4	57	2 1/2 to 4	29 15
4 1/2 to 6	56	4 1/2 to 6	28 14
7 to 8	52	7 to 8	21 15
9 and 10	45	9 to 12	16 2
11 and 12	44		

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1 1/2 points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2 1/2%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
Inches	Black	Inches	Black
2 to 2 1/2 in.	27	1 1/2 in.	+18
2 1/2 to 3 in.	37	1 1/2 to 1 3/4 in.	+8
3 in.	40	2 to 2 1/2 in.	-2
3 1/2 to 3 3/4 in.	42 1/2	2 1/2 to 3 in.	-7
4 to 13 in.	46	3 1/4 to 4 1/2 in.	-9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn		Hot Rolled	
Inches	Black	Inches	Black
1 in.	60	3 in.	45
1 1/4 to 1 1/2 in.	52	3 1/4 to 3 1/2 in.	47
1 1/2 in.	36	4 in.	50
2 to 2 1/2 in.	31	4 1/2, 5 and 6 in.	45
2 1/2 to 2 3/4 in.	39		

2 and 2 1/4 in.	37	3 1/4 and 3 1/2 in.	58
2 1/2 and 2 3/4 in.	45	4 in.	56
3 in.	51	4 1/2, 5 and 6 in.	51

Less carloads, 4 points less. Add \$3 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List	
Carbon, 0.10% to 0.30%, base.....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercially exact lengths. Warehouse discounts on small lots are less than the above.	

demand for boiler tubes is still light and tubing requirements of the motor car builders are also small. In spite of the dullness, prices are holding except on line pipe, which usually is competitive, and deviations on butt-welded pipe are not entirely unknown.

Sheets.—Business of the American Sheet & Tin Plate Co. last week was equal to 85 per cent of the weekly average of the best year in its history, and some of the independent companies also report increased bookings. The more accurate description of the general market, however, is that it is improving, but is not active. Price uncertainty is still present but has not produced concessions of any account, and some even say that the market is steadier than it has been. A normal demand from the automobile builders is necessary to give the market tone, and prices would make a stronger showing if resale prices did not reflect the fact that some mills were a little too lenient in accepting specifications against low-priced business taken earlier in the year. Comparatively little business has come to the mills at present prices, which became effective around the first of June. Mill operations last week were about 65 per cent of capacity, but some increase is looked for this week.

Tin Plate.—Lack of frosts has helped to bring to maturity a good many of the late crops and the demand for tin plate has been helped somewhat by that fact, but only by a considerable stretch of the imagination can the market be called even moderately active. While some makers are busier, the general average of mill operations is still around 65 per cent of capacity, or more than 20 points under the rate at this time last year. Nothing yet has come out as to next year's prices.

Cold-Finished Steel Bars and Shafting.—The market has settled to 2.20., base Pittsburgh, for ordinary ton-nages. That price, originally named to large Detroit consumers, had to be extended to parts makers outside of that district and lately has become common in other parts of the country. The low rate of demand from automobile parts makers is not made good by the purchases of other consuming industries, and with not enough business to go around, competition for orders is rather sharp.

Hot-Rolled Flats.—Continued paucity of orders from the automobile industry has brought the activity of strip, hoop and band makers to a very low stage. Demand has been progressively lower for several weeks, and 50 per cent is probably a liberal estimate of mill operations. There is an undertone of uncertainty to prices but, so far, no important deviations from the ruling quotations. A new scale of quantity price differentials is reported to be in preparation.

Cold-Rolled Strips.—Most makers have abandoned the recent method of quantity price basings and are now quoting 3.25c., base, for lots of 1 ton to, but not including, 3 tons of one size and temper for one shipment and 3c., base, for lots of 3 tons or more. Business is extremely dull owing to the failure of buying

by the automobile industry. There are fears that the remainder of the year will be dull, since it is not common for that industry to show a rising scale of operations during the final quarter of the year.

Bolts, Nuts and Rivets.—Signed fourth quarter contracts are coming along fairly freely, but current demands and specifications are light in keeping with requirements, which have been curtailed by light operations of the motor car and railroad car builders. Prices generally are firm, but the quotation of \$3, base, per 100 lb., on large rivets is merely nominal.

Warehouse Business.—A revision in mill prices of plates, shapes and bars, carrying them well under those ruling when the present warehouse schedule was formulated, has brought no change in the latter. But warehouse prices are subject to shading, particularly on bars, which have been sold as low as 2.50c., base, as compared with 2.90c., the common quotation. The decline of \$2 a ton in mill prices of cold-finished steel bars also is yet to be reflected in warehouse prices. Business has been disappointingly light this month. As August registered a gain over the month before, there was a common expectation that this month would continue the expansion.

Coke and Coal.—Spot coke is a drag on the market. While oven operators have sought to bring about equilibrium in supply and demand, demand has been shrinking a little too rapidly for them to keep pace with it. Actually, there is no blast furnace demand for furnace grade, and it has to be sold for other purposes. While producers, in some cases, are asking \$3.15 per net ton, ovens, \$3 seems to be as much as can be obtained, and as low as \$2.85 is easily done. Spot foundry coke ranges from \$3.75 to \$4.75, but most sales are at \$4 to \$4.50. Coal producers have been hoping for a revival of demand from the Middle West since the conference between Illinois operators and miners failed to reach an agreement, because there is too much coal for their regular outlets and prices are unprofitable.

Old Material.—Interest in the market on the part of melters is light, and the dullness is rather intensified by the fact that dealers are not speculating. Prices are holding well because offerings are moderate, and two or three steel mills that usually pay a premium to get the kind of scrap they want are getting directly or through agents practically all of the railroad steel. Machine shop turnings are scarce, with the leading consumer getting little material on a bid of \$12. Short shoveling steel turnings can be delivered on machine shop turning orders and command the same price when this is done, but for blast furnace use \$11.50 appears to be the limit of local users.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:

Heavy melting steel	\$15.25 to \$15.50
Scrap rails	14.50 to 15.00
Compressed sheet steel	14.50 to 15.00
Bundled sheets, sides and ends	13.50 to 14.00
Cast iron carwheels	15.00 to 15.50
Sheet bar crops, ordinary	15.50 to 16.00
Heavy breakable cast	14.00 to 14.50
No. 2 railroad wrought	15.25 to 15.50
Heavy steel axle turnings	14.00 to 14.50
Machine shop turnings	12.00

Acid Open-Hearth Furnace Grades:

Railroad knuckles and couplers	16.75 to 17.00
Railroad coil and leaf springs	16.75 to 17.00
Roller steel wheels	16.75 to 17.00
Low phosphorus billet and bloom	20.00 to 20.50
ends	19.50 to 20.00
Low phosphorus, mill plate	17.00 to 17.50
Low phosphorus, light grade	19.00 to 19.50
Low phosphorus sheet bar crops	14.00 to 14.50
Heavy steel axle turnings	14.00 to 14.50

Electric Furnace Grades:

Low phosphorus punchings	17.00 to 17.50
Heavy steel axle turnings	14.00 to 14.50

Blast Furnace Grades:

Short shoveling steel turnings	12.00
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
No. 2 bushelling	10.25 to 10.50

Rolling Mill Grades:

Steel car axles	19.00 to 20.00
No. 1 railroad wrought	12.00 to 12.50

Cupola Grades:

No. 1 cast	15.00 to 15.50
Rails 3 ft. and under	16.00 to 16.50

Malleable Grades:

Railroad	15.25 to 15.50
Industrial	14.75 to 15.00
Agricultural	14.25 to 14.50

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c. to 3.65c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.75c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.60c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.30c.
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, ¾ in. and smaller, per 100 count	62½ per cent off list
Machine bolts, per 100 count	62½ per cent off list
Carriage bolts, per 100 count	62½ per cent off list
Nuts, all styles, per 100 count	62½ per cent off list
Large rivets, base per 100 lb.	\$3.50
Wire, black soft annealed, base per 100 lb.	2.90
Wire, galvanized soft, base per 100 lb.	2.90
Common wire nails, per keg	\$2.80 to 2.90
Cement coated nails, per keg	2.85 to 2.95

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms	
	Per Gross Ton
Rerolling, 4-in. and over.....	\$33.00
Rerolling, under 4-in. to and including 1½-in.	\$33.50 to 34.00
Forging, ordinary	38.00 to 40.00
Forging, guaranteed	44.00 to 45.00
Sheet Bars	
	Per Gross Ton
Open-hearth or Bessemer.....	\$34.00

Slabs	
	Per Gross Ton
8 in. x 2 in. and larger.....	\$33.00
Smaller than 8 in. x 2 in.	34.00
Skelp	
	Per Lb.
Grooved	1.75c. to 1.85c.
Sheared	1.75c. to 1.85c.
Universal	1.75c. to 1.85c.

Wire Rods	
	Per Gross Ton
*Common soft, base.....	\$43.00
Screw stock	\$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

*Chicago mill base is \$44. Cleveland mill base, \$42 to \$43.

Prices of Raw Material

Ores	
Lake Superior Ores, Delivered Lower Lake Ports	
	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	
	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....	10.50c.
Iron ore, Swedish, average 66% iron, 9.75c. to 10.00c.	
Manganese ore, washed, 52% manganese, from the Caucasus.....	40c. to 41c.
Manganese ore, Brazilian, African or Indian, basis 50%	40c. to 42c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$10.50 to \$10.75
Per Gross Ton	
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS ₂ delivered	50c. to 55c.

Ferromanganese	
	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$90.00
Foreign, 80%, Atlantic or Gulf port, duty paid	90.00
Spiegeleisen	
	Per Gross Ton Furnace
Domestic, 19 to 21%	\$33.00 to \$34.00
Domestic, 16 to 19%	32.00 to 33.00

Electric Ferrosilicon	
	Per Gross Ton Delivered
50%	\$85.00 to \$87.50
75%	145.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
	Per Gross Ton Furnace
12%	\$39.00
14 to 16%	\$45 to 46.00

Bessemer Ferrosilicon	
F.o.b. Jackson County, Ohio, Furnace	
	Per Gross Ton
10%	\$34.00
11%	36.00
	Per Gross Ton
12%	\$38.00

Silvery Iron	
F.o.b. Jackson County, Ohio, Furnace	
	Per Gross Ton
6%	\$26.50
7%	27.50
8%	28.50
9%	30.00
	Per Gross Ton
10%	\$32.00
11%	34.00
12%	36.00

Other Ferroalloys	
Ferrotungsten, per lb. contained metal, del'd	95c. to \$1.05
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.50c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65
Ferrocobalt, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton.....	\$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton.....	\$122.50

Fluxes and Refractories	
Fluorspar	
	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	\$16.00 to \$16.50
No. 2 lump, Illinois and Kentucky mines	\$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid.....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay	
Per 1000 f.o.b. Works	
First Quality	Second Quality
Pennsylvania ...	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey ...	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton	7.00

Silica Brick	
Per 1000 f.o.b. Works	
Pennsylvania	\$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick	
Per Net Ton	
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick	
Per Net Ton	
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts	
Per 100 Pieces	
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
	Per Cent Off List
†Machine bolts .....	.70
†Carriage bolts .....	.70
Lag bolts .....	.70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	.70
Hot-pressed nuts, blank or tapped, square....	.70
Hot-pressed nuts, blank or tapped, hexagon....	.70
C.p.c. and t. square or hex. nuts, blank or tapped .....	.70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled threads up to and including ¾ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts	
Per Cent Off List	
Semi-finished hexagon nuts.....	.70
Semi-finished hexagon castellated nuts, S.A.E. ....	.70
Stove bolts in packages.....	.80, 10 and 5
Stove bolts in bulk.....	.80, 10, 5 and 2½
Tire bolts .....	.60, 5 and 5

Large Rivets	
(½-In. and Larger)	
Base per 100 Lb.	
F.o.b. Pittsburgh or Cleveland.....	\$2.75 to \$3.00
F.o.b. Chicago	2.85 to 3.10

Small Rivets	
(¾-In. and Smaller)	
Per Cent Off List	
F.o.b. Pittsburgh .....	.70, 10 and 5
F.o.b. Cleveland .....	.70, 10 and 5 to 70 and 10
F.o.b. Chicago .....	.70, 10, 10 and 5 to 70 and 10

Cap and Set Screws	
(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	
Per Cent Off List	
Milled cap screws.....	.80, 10 and 10
Milled standard set screws, case hardened, 80 and 10	
Milled headless set screws, cut thread.....	.80
Upset hex. head cap screws, U.S.S. thread, 85 and 5	
Upset set screws.....	.80, 10 and 10
Milled studs .....	.70 and 5

Chicago

Shapes and Plates Weak—Heavy Rail Purchases in Prospect

CHICAGO, Sept. 20.—Little change has taken place in the Chicago steel market during the week. Forward contracting in all lines is light and, to date, is not on a par with what it was at this time a year ago, indicating that users are devising ways of meeting their requirements at even closer range. The price situation may have some bearing on the size of orders, but another factor is the uncertainty of what the future holds. Mill prices on soft steel bars are holding at 1.90c., Chicago, but shapes and plates are quite commonly quoted at 1.85c. to fabricators when tonnages are attractive. Both specifications and new business in finished steel approximate shipments, which represent close to 60 per cent of local steel mill capacity.

Revised differentials have been announced this week on cold-rolled strip, the base price at Cleveland now being 3c. on lots of 3 tons or more, with quantity extras ranging from 25c. up to \$1 per 100 lb. for lots of 500 lb. up to less than 3 tons.

Inquiry for rails is drawing the attention of steel makers in this district, it being rather commonly believed that Western mills may receive a larger portion of orders from Eastern railroads for the reason that in late years more attention has been given to laying heavy-section rails near seaboard terminals than in the Chicago territory.

Pig Iron.—Competition for going business is keener as the result of orders recently taken direct by an Ohio steel company. A second boat shipment from Cleveland has been unloaded and is now being delivered to buyers who placed orders prior to the time that the cargo left the Lake Erie port. New buying, except in lots of 500 tons and less, is dull, and shipments are not holding up to the average of the first two weeks in this month. The cut in deliveries is sufficiently sharp so that, with one group of furnaces supplying less iron to the merchant trade than in early September, other producers are finding it necessary to pile iron on the ground. Fresh inquiry includes 500 tons for a melter in western Illinois and a like tonnage of foundry iron for a user in southern Wisconsin. Local producers are holding to \$19.50, base local furnaces, but this price is lacking in strength. Miscellaneous carload orders of silvery are being taken at the full schedule.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	\$19.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.00
Malleable, not over 2.25 sil.	19.50
High phosphorus	19.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	23.26
Southern No. 2 (barge and rail)	21.43
Low phos., sil. 1 to 2 per cent, copper free	\$31.50 to 32.00
Silvery, sil. 8 per cent.	33.29
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Spiegeleisen in the 19 to 21 per cent grade lacks strength at \$33, Hazard, Pa. That price is readily obtained on carload lots, but producers are looking for heavier tonnages and in several instances buyers have been asked to make offers. Ferromanganese is dull, with prices nominally at \$90, seaboard.

Prices delivered Chicago: 80 per cent ferromanganese, \$97.56; 50 per cent ferrosilicon, \$85 to \$87.50; spiegeleisen, 18 to 22 per cent, \$40.76 to \$41.76.

Plates.—Inquiry for oil tank plates totaling about 3000 tons appears to have faded from the market, and mills are now basing their hopes for future business on several new tank farm programs which now give some promise of taking definite form. A manufacturer in this district of large-diameter welded pipe made from plates has forwarded heavy shipments of his product in the last few weeks, but has sent very light

specifications to mills in the past week. Miscellaneous users continue to send in numerous orders. Specifications from railroad car builders are tapering, and there is no new inquiry for railroad equipment. Deliveries on all sizes of plates are prompt, mill order books being light and rolling schedules difficult to arrange for economical operation. Mill prices lack strength at 1.90c., Chicago.

Mill prices on plates per lb.: 1.90c., base, Chicago.

Structural Material.—The Duffin Iron Co., Chicago, has been awarded 1600 tons for the Madison-Clark Building. Fresh inquiry, except for 600 tons for an industrial building at West Pullman, Ill., and 400 tons for a highway bridge at Victoria, Wis., is dragging, and older projects give no more indication of developing into actual orders than they did earlier in the summer. Fabricators are holding stocks to the minimum, buying only when they receive contracts. This method of covering for steel brings the prices of mill products in close relation to the shop selling prices. Competition is no less keen among fabricators than it is between mills, and though the market on plain material is quotable at 1.90c., Chicago, several deals have brought out as low as 1.85c. At Milwaukee quotations have been made on the basis of 1.80c., Chicago. On the whole, the market does not appear to have settled to a price of 1.85c., but quotations at 1.90c. are without strength. Lack of structural awards is being felt keenly by shops, where operations vary from 40 per cent to 70 per cent, with the average not far from 55 per cent of capacity.

Mill prices on plain material per lb.: 1.90c., base Chicago.

Reinforcing Bars.—The week's activity in reinforcing bars has been confined largely to awards of rail steel. A new apartment building on East Delaware Place, Chicago, calls for 500 tons, and about 200 tons of an expected 500 tons for Cook County and Illinois State road work has been placed. For the first time in many months fresh inquiry has dropped to the point where estimating departments are not rushed. Hot weather has no doubt retarded construction work, but shipments have been heavier than incoming tonnage and several shops have been forced to cut output of bent bars. New awards and fresh inquiries are shown on page 840.

Bars.—The steady and widespread demand for soft steel bars is one of the bright spots in the local steel market. Users, however, are seldom willing to make commitments beyond 30 to 60 days, with the result that fourth quarter contracting is making little headway and is smaller than at this time a year ago. Orders from road machinery builders indicate an active business in the early fall, and there is no lessening in the rate at which agricultural farm equipment manufacturers are taking steel. Automobile parts makers are slightly less active, and those who have been expecting orders from the Ford Motor Co. have as yet received business only in small lots. Mill prices for mild steel bars are at 1.90c., Chicago. Iron bars are holding at 2c., Chicago, but sales are light and no real test has been offered since the decline in steel bar prices. Orders for alloy steel bars are a trifle smaller, but production is holding this week at 70 per cent of capacity. Users of rail steel bars find that their needs have expanded, and there is a tendency among buyers to cover further in advance. Bed manufacturers are looking for a better demand for their products, and they are giving more consideration to the condition of stocks in hand. Schedules now being made by that class of buyers indicate that shipments this fall may run larger than at any time in the last four or five months. Shipments of fence posts so far in September are heavy. Hard steel bar prices are unchanged at 1.90c., Chicago.

Mill prices per lb.: Soft steel bars, 1.90c. base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.90c., base, Chicago.

Sheets.—Demand is slowly subsiding, and producers have cut operations to 65 per cent of hot mill capacity. Fourth quarter contracting is sluggish, giving the trade the impression that there will be no immediate change from the practice of hand-to-mouth buying. Order books are gradually shrinking, and delivery on any

finish can be had in less than two and one-half weeks. Barrel and container manufacturers are taking fairly liberal shipments of blue annealed sheets in the heavier gages. Chicago district mill prices are unchanged.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.15c.; No. 24 galvanized, 4c.; No. 10 blue annealed, 2.40c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Bolts, Nuts and Rivets.—Specifications are in larger volume, due in some measure to the added requirements of farm machinery manufacturers. Orders from the trade in general are spotty and give no indication of a trend one way or the other. Fourth quarter contracting is making progress but has not got under way so rapidly as in previous selling periods this year.

Wire Products.—Fourth quarter contracting is making slow progress, the total volume of orders taken so far this year being far behind bookings up to this time a year ago. Some unsettling of nail prices in Iowa appears to have passed without disturbing the market throughout the Middle West. Although producers generally are quoting \$2.60, Chicago, on common wire nails, quantity buying has been lacking. The jobbing trade in the Southwest is taking larger shipments, but the expected upturn in business in the Northwest has not come. On the whole, specifications from the jobbing and the manufacturing trade so far in September are not far from the average for July and August.

Rails and Track Supplies.—Keen interest is being shown in the rail market. The Louisville & Nashville is said to have placed 61,000 tons with the Tennessee Coal, Iron & Railroad Co. An inquiry is out from the Pennsylvania for 300,000 tons, and the Santa Fe is expected to enter the market for about 145,000 tons. Producers now estimate that not less than 700,000 tons of rail business is in the making.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, \$43; light rails, rolled from billets, \$36 to \$38. *Per Lb.:* Standard railroad spikes, 2.90c.; track bolts with square nuts, 3.90c.; steel tie plates, 2.35c.; angle bars, 2.75c.

Cast Iron Pipe.—Further evidence of weakness in pipe prices is indicated this week in the shading of \$26, Birmingham, on 800 tons of 4 to 10-in. Class B pipe ordered for delivery to Anchorville, Mich. The price paid was \$25.75, Birmingham, or \$34.35, delivered. Detroit has divided 6500 tons of 8-in. and 4500 tons of 6-in. centrifugal pipe among the American Cast Iron Pipe Co., the National Cast Iron Pipe Co. and the United States Cast Iron Pipe & Foundry Co. That city placed the 30-in. and the 36-in. sand cast pipe with the United States company and the Lynchburg Foundry Co. The former is said to have bid \$37.50, delivered, and the latter, \$36.20, on 1000 tons. Chicago has placed 100 tons of 3-in. to 24-in. fittings with the American Cast Iron Pipe Co., and is now asking for prices on 500 tons of 12-in. pipe, 100 tons of fittings and a miscellaneous lot of pipe and fittings for a water pipe tunnel. Alliance, Ohio, will take bids on 275 tons of miscellaneous sizes for a sewage disposal plant.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, \$34.20 to \$37.20; 4-in., \$38.20 to \$41.20; Class A and gas pipe, \$4 extra.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel.....	2.05c. to 2.15c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10).....	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws.....	60
Hot-pressed nuts, squares, tapped or blank..	60
Hot-pressed nuts, hexagons, tapped or blank.	60
No. 8 black annealed wire, per 100 lb.....	\$3.20
Common wire nails, base per keg.....	\$2.85 to 2.95
Cement coated nails, base per keg.....	2.95

Cold-Rolled Bars.—Demand has risen sharply, following a dull period of more than a month. Producers have cut prices \$2 a ton, making the Chicago quotation 2.20c. Although buying is in good volume, the bulk of it is at close range, fourth quarter contracting not having made much progress.

Cold-Rolled Strip.—A decline in specifications has forced operations down to about 60 per cent of capacity. Forward contracting is making slow progress.

Coke.—This market is steady, with no deviation noted from the going prices of \$9.75, local ovens, and \$10.25, delivered in the Chicago switching district.

Old Material.—The market is dull. Users are holding stocks to the minimum and are demanding prompt shipments as their small wants become pressing. The supply on all grades, with the possible exception of cast iron borings, is adequate to meet demands, and brokers are having no trouble in filling their obligations. Railroad lists in the last few weeks have been heavy. The Santa Fe last week sold 1200 tons of heavy melting steel, and the Rock Island is offering 1400 tons of No. 1 and No. 2 wrought. New lists include 9000 tons offered by the Rock Island and 800 tons advertised by the Chicago Great Western.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	\$12.25 to \$12.75
Shoveling steel	12.25 to 12.75
Frogs, switches and guards, cut apart, and miscellaneous rails.	14.00 to 14.50
Hydraulic compressed sheets....	10.50 to 11.00
Drop forge flashings	9.25 to 9.75
Forged, cast and rolled steel car-wheels	15.50 to 16.00
Railroad tires, charging box size.	15.50 to 16.00
Railroad leaf springs, cut apart..	15.50 to 16.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles....	14.00 to 14.50
Coil springs	15.50 to 16.00
Low phosphorus punchings.....	14.25 to 14.75
Electric Furnace Grades:	
Axle turnings	12.00 to 12.50
Blast Furnace Grades:	
Axle turnings	11.00 to 11.50
Cast iron borings	10.75 to 11.25
Short shoveling turnings	10.75 to 11.25
Machine shop turnings	7.50 to 8.00
Rolling Mill Grades:	
Iron rails.....	13.50 to 14.00
Rerolling rails	15.25 to 15.75
Cupola Grades:	
Steel rails less than 3 ft.....	15.50 to 16.00
Angle bars, steel.....	13.75 to 14.25
Cast iron carwheels.....	14.25 to 14.75
Malleable Grades:	
Railroad	13.75 to 14.25
Agricultural	13.00 to 13.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb.....	23.00 to 25.00
*Relaying rails, 65 lb. and heavier.	26.00 to 31.00

Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms....	19.00 to 19.50
Iron car axles	20.50 to 21.00
Steel car axles	17.75 to 18.25
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	10.75 to 11.25
No. 1 busheling	9.25 to 9.75
No. 2 busheling	5.25 to 5.75
Locomotive tires, smooth	13.75 to 14.25
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.50 to 14.00
No. 1 agricultural cast	13.00 to 13.50
Stove plate	13.00 to 13.50
Grate bars	11.50 to 12.00
Brake shoes	10.50 to 11.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Trade Commission May Abandon Bethlehem Complaint

WASHINGTON, Sept. 20.—Representatives of the Bethlehem Steel Co. and the Federal Trade Commission were in conference here today with the board of review of the commission regarding a plan to either revise or entirely abandon the pending complaint of the commission against the Bethlehem company. The commission made no announcement as to whether any conclusions had been reached.

New York

Steel Price Stabilization Uncertain—Pig Iron Still Highly Competitive

NEW YORK, Sept. 20.—Efforts of pig iron producers to stiffen prices have been successful in connection with small-lot sales, which comprised most of the business of the week. Buffalo foundry iron has brought \$16.50, base furnace, and in some instances as high as \$17. The only real test of the market, however, a 1000-ton purchase of foundry iron by a New Jersey melter, developed as keen competition as has prevailed at any time during the past summer. The successful seller was an eastern Pennsylvania producer, with a price of \$20.14, delivered, or \$18.75, base furnace. Total sales by local brokers during the past week fell short of 4000 tons. An inquiry from the Burnham Boiler Corporation, Irvington, N. Y., for 300 to 400 tons of foundry iron is the only fresh business in prospect of any size.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25 (all rail)	\$20.91 to \$21.91
No. 2 plain fdy. (by barge, del'd alongside in lighterage limits N. Y. and Brooklyn)	18.50 to 19.50
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.14 to 22.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.64 to 22.52
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.14 to 23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

Finished Steel.—If the purpose of the announcement by the Carnegie Steel Co. of 1.75c., Pittsburgh, as its minimum on large lots of plates, shapes and bars and 1.85c. on small lots was to stabilize prices at those levels, it has not yet had that effect in this district. To some extent it has had a mixed effect. In the case of steel bars it means a reduction of \$1 a ton by some mills, which have successfully maintained a basis of 1.80c., Pittsburgh, on the average run of orders, although they have sold at 1.75c. to preferred trade. There is doubt as to whether mills will be able to maintain a price of 1.85c. on small lots, in view of the naming of 1.75c. as an available quotation. Independent makers of plates and shapes received the news of the Carnegie announcement with satisfaction because of the fact that prices on those products have gone below 1.75c., Pittsburgh. It is too soon to ascertain definitely what the effect will be on prices of plates and shapes, but up to today there has been no change. Plates have been sold within the week at 1.70c. and 1.75c., Pittsburgh, and it is only the smallest and least desirable orders that bring 1.80c. Carload lots of shapes are being quoted at 1.70c. and 1.75c., Pittsburgh, and nothing has developed yet to curtail the granting of concessions from these figures on the large tonnages. The volume of orders for sheets has been so far below normal in this district during the past week that the lower price indications of a week ago have not resulted in a general downward tendency. Makers of blue annealed sheets have been forced to go to 2.15c., Pittsburgh, on the narrow widths to meet competition of strip sheet producers, but on widths greater than 36 in., they have in most instances been able to get 2.25c. On black sheets there have been more general concessions of \$1 and \$2 a ton. Sales offices report, however, that most of their sales of galvanized sheets have been at 3.85c., Pittsburgh, and if there has been any cutting it has not become widespread. The announcement of a change in quantity differentials on cold rolled strip steel pleases both buyers and sales representatives. The new selling arrangement establishes a base of 3.25c. per lb. for lots of 3 tons or less, and the discount for lots of more than 3 tons is 25c. per 100 lb. Hot rolled strip steel is slightly weak in price, but concessions are being granted only on the most attractive orders. Such concessions usually amount to \$2 a ton.

Mill prices per lb. delivered New York: Soft steel bars, 2.09c. to 2.19c.; plates, 2.04c. to 2.14c.; structural shapes, 1.90c. to 2.09c.; bar iron, 2.09c. to 2.14c.

Reinforcing Bars.—A projected stores building for the United States Appraisers in this city will require about 3000 tons of bars. A plant for the American Can Co. at Jersey City, N. J., will take 1500 tons. The revision in mill prices on bars has not yet affected the market on reinforcing bars. There has not been enough business before the local market to give prices a real test. Current lettings are small.

Prices per lb. on billet steel reinforcing bars: From mill, 1.90c., Pittsburgh. Out of New York warehouse, 3.05c. to 3.15c., delivered at job. Out of Youngstown warehouse, 2.40c., Youngstown, or 2.77½c., delivered New York.

Cast Iron Pipe.—There is beginning to be less inclination by Southern makers to quote lower than \$28 per net ton, base Birmingham, but prices are still far from firm. The extra for Class A and gas pipe seems to fluctuate with Southern foundries between \$3 and \$4 per ton and with Northern makers between \$4 and \$5 per ton. On a recent opening of bids on about 400

Warehouse Prices, f.o.b. New York

	Base per Lb.	
Plates and structural shapes.....	3.34c.	
Soft steel bars and small shapes.....	3.24c.	
Iron bars	3.24c.	
Iron bars, Swedish charcoal.....	7.00c. to 7.25c.	
Cold-finished steel shafting and screw stock—		
Rounds and hexagons	4.00c.	
Flats and squares.....	4.50c.	
Cold-rolled strip, soft and quarter hard.....	5.75c. to 6.25c.	
Hoops	4.49c.	
Bands	3.99c.	
Blue annealed sheets (No. 10 gage).....	3.89c.	
Long terne sheets (No. 24 gage).....	5.80c.	
Standard tool steel	12.00c.	
Wire, black annealed	4.50c.	
Wire, galvanized annealed.....	5.15c.	
Tire steel, 1½ x ½ in. and larger.....	3.30c.	
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.	
Open-hearth spring steel, bases.....	4.50c. to 7.00c.	
Machine bolts, cut thread: Per Cent Off List		
¾ x 6 in. and smaller.....	55 to 60	
1 x 30 in. and smaller.....	50 to 50 and 10	
Carriage bolts, cut thread:		
½ x 6 in. and smaller.....	55 to 60	
¾ x 20 in. and smaller.....	50 to 50 and 10	
Coach screws:		
½ x 6 in. and smaller.....	55 to 60	
1 x 16 in. and smaller.....	50 to 50 and 10	
Boiler Tubes— Per 100 Ft.		
Lap welded steel, 2-in.....	\$17.33	
Seamless steel, 2-in.....	20.24	
Charcoal iron, 2-in.....	25.00	
Charcoal iron, 4-in.....	67.00	
Discounts on Welded Pipe		
Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap.....	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+9
1-1½-in. butt	14	+6
2-in. lap	5	+14
3-6-in. lap	11	+6
7-12-in. lap	3	+16
Tin Plate (14 x 20 in.)		
	Prime	Seconds
Coke, 100 lb. base box.....	\$6.45	\$6.20
Charcoal, per box—	A	AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00
Terne Plate (14 x 20 in.)		
IC—26-lb. coating	\$10.00 to \$11.00	
IC—30-lb. coating	12.00 to 13.00	
IC—40-lb. coating	13.75 to 14.25	
Sheets, Box Annealed—Black, C. R. One Pass		
	Per Lb.	
Nos. 18 to 20.....	3.95c. to 4.00c.	
No. 22	4.10c. to 4.15c.	
No. 24	4.15c. to 4.20c.	
No. 26	4.25c. to 4.30c.	
No. 28*	4.40c. to 4.45c.	
No. 30	4.65c. to 4.70c.	
Sheets, Galvanized		
	Per Lb.	
No. 14	4.35c.	
No. 16	4.45c.	
No. 18	4.55c. to 4.60c.	
No. 20	4.70c. to 4.75c.	
No. 22	4.75c. to 4.80c.	
No. 24	4.90c. to 4.95c.	
No. 26	5.15c. to 5.20c.	
No. 28*	5.40c. to 5.45c.	
No. 30	5.80c. to 5.85c.	

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

tons of water pipe by Putnam, Conn., a Northern maker and the Pont-a-Mousson works, the French producer, were high. Other tenders were \$37.75 per ton by R. D. Wood & Co., Philadelphia; \$38 per ton by the United States Cast Iron Pipe & Foundry Co. and \$38.10 per ton by the National Cast Iron Pipe Co. The Passaic Water Works, Passaic, N. J., has opened bids on about 3000 tons of 30 and 36-in. water pipe, and Des Moines, Iowa, on about 900 tons of 4 to 12-in. water pipe. The leading producer is reported to have been low in both instances. Harriman, N. Y., will open bids this week on about 300 tons, and the Department of Purchase, New York, will open bids tomorrow on about 4000 tons of pipe. As part of the severe competition for pipe tonnage that has been a feature of the market recently, producers of centrifugally cast pipe by the sand spun and De Lavaud processes have been seeking tonnage and quoting low prices. The result has been a slightly larger movement of centrifugal pipe than usual, mostly to private users.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, \$37.25 to \$38.25; 4-in. and 5-in., \$42.25 to \$43.25; 3-in., \$52.25 to \$53.25; Class A and gas pipe, \$4 to \$5 extra.

Warehouse Business.—There is a moderate volume of purchasing from stock, and September will apparently compare favorably with August. A fair tonnage of structural material is moving, and there is some demand for black and galvanized sheets. Prices still show a tendency toward weakness. Concessions for sheet orders, however, seldom exceed 5c. per 100 lb., so that the black sheet market is quotable at 4.15c. to 4.20c. per lb., base, and galvanized sheets at 4.90c. to 4.95c. per lb., base.

Old Material.—Most grades of scrap seem to have reached a level of prices at which there is but little fluctuation. No. 1 heavy melting steel continues quiet and unchanged in price at \$13.50 per ton, delivered eastern Pennsylvania. Shipments of yard steel are going forward to Pottsville, Pa., for which \$10.75 to \$11 per ton is being paid, and to Harrisburg and Phoenixville, Pa., for which \$11.50 per ton is paid. A recent sale of stove plate at \$13.50 per ton, eastern Pennsylvania, has justified a buying price of \$13 per ton, delivered. Foundry stove plate ranges from \$9.50 to \$9.75 per ton, New York. Cast borings are being purchased at \$11.50 per ton, delivered Harrisburg, Pa., or about \$7.75, New York. Forge fire at \$11 per ton, delivered eastern Pennsylvania, is quotable at \$7.50, New York. No blast furnace material is moving to Swedeland at present, and shipments of heavy melting steel to Conshohocken, Pa., have been temporarily suspended.

Dealers' buying prices per gross ton, New York:

No. 1 heavy melting steel.....	\$10.00 to \$10.85
Heavy melting steel (yard).....	7.00 to 8.00
No. 1 heavy breakable cast.....	11.50 to 12.50
Stove plate (steel works).....	9.25 to 9.50
Locomotive grate bars.....	8.75 to 9.25
Machine shop turnings.....	7.00 to 7.50
Short shovelling turnings.....	7.00 to 7.50
Cast borings (blast furnace or steel works).....	7.25 to 7.75
Mixed borings and turnings.....	6.50 to 7.50
Steel car axles.....	16.25 to 17.25
Iron car axles (nom.).....	23.50 to 24.00
Iron and steel pipe (1 in. diam., not under 2 ft. long).....	9.25
Forge fire.....	6.50 to 7.00
No. 1 railroad wrought.....	11.50 to 12.00
No. 1 yard wrought, long.....	10.50 to 11.00
Rails for rolling.....	10.25 to 10.75
Cast iron carwheels.....	11.50 to 12.00
Stove plate (foundry).....	9.50 to 9.75
Malleable cast (railroad).....	10.25 to 10.75
Cast borings (chemical).....	11.00 to 11.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast.....	\$14.00 to \$14.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	12.50 to 13.00
No. 2 cast (radiators, cast boilers, etc.).....	11.50 to 12.00

Coke.—The slight strength that was in evidence recently has not continued in the foundry coke market, and standard Connellsville foundry coke is quoted at \$4 to \$4.25 per net ton, ovens, with less than \$4 per ton occasionally done on prompt shipment business. The furnace coke market is holding fairly well at \$3 to \$3.25 per net ton, Connellsville, but plenty of prompt shipment material is evidently available at the lower price and contracts for last quarter have been made at \$3.25 to \$3.50 per ton. Delivered prices on Connellsville foundry coke are: To northern New Jersey, \$8.03

to \$8.28; to New York or Brooklyn, \$8.79 to \$9.04; to Newark or Jersey City, N. J., \$7.91 to \$8.16. Some West Virginia by-product coke is being sold in this district on a basis of \$5.75 per net ton, f.o.b. ovens, and a freight rate of \$3.71 into Newark or Jersey City. In consequence the range of the market is \$9.46 and \$9.59 to \$10.77 per net ton, delivered Newark or Jersey City.

Philadelphia

Pennsylvania Railroad Issues Large Rail and Other Finished Steel Inquiries

PHILADELPHIA, Sept. 20.—The Pennsylvania Railroad, which has for some months bought steel in much smaller quantities than is its custom, has issued an inquiry for 200,000 tons of 130-lb. rails, with option on 50 per cent additional, and is taking bids on upward of 25,000 tons of plates, shapes, bars and other forms of steel for fourth quarter requirements. The rail inquiry calls for bids by Sept. 29, and the quantity, which may reach 300,000 tons in view of the fact that the road has usually exercised its options, is probably the largest the Pennsylvania has ever sought at one time. The opening of bids on miscellaneous products on Sept. 30 may give an inkling of how independent mills will stand on plates, shapes and bars in relation to the price of 1.75c., Pittsburgh, named by the Carnegie Steel Co. for large lots.

To a moderate degree, steel business has improved in volume in the past week. There are some exceptions, sheets being one, but on the whole September tonnage is expected to run slightly ahead of that taken in August. The price situation on sheets is not yet well clarified, but concessions of \$1 and \$2 a ton are being given on black sheets, while 2.15c., Pittsburgh, is now the ruling price on blue annealed sheets between 24 and 36 in., while on the wider sizes the mills are able in most cases to get 2.25c.

Pig iron has turned weaker, and while our quotations for Philadelphia delivery show no change this week the prices that are netted at the furnace on some competitive business have dipped below \$19, base, on foundry grades. Basic pig iron has been sold at \$20, delivered.

Pig Iron.—Following the recent blowing in of two furnaces which had been idle for a short time, competition for pig iron orders has become keener and prices have weakened. For Philadelphia delivery the minimum seems to be \$20.26, base, which figures back to \$19.50 at the nearest furnaces. Delivered prices at other points are little, if any, below this figure, but the higher freight rates from some furnaces to points of delivery in this district other than Philadelphia have resulted in prices at the furnace netting \$19 or less in some instances. Included in the week's sales was 6000 tons of basic iron, which went at \$20, delivered, this being in line with other recent transactions in that grade. The volume of buying has not gained ma-

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, 1/4-in. and heavier.....	2.65c. to 3.00c.
Plates, 3/8-in.	3.00c. to 3.20c.
Structural shapes.....	2.65c. to 3.00c.
Soft steel bars, small shapes and iron bars (except bands).....	2.65c. to 3.00c.
Round-edge iron.....	3.50c.
Round-edge steel, iron finished, 1 1/2 x 1 1/2 in.	3.50c.
Round-edge steel, planished.....	4.30c.
Reinforcing steel bars, square, twisted and deformed.....	3.00c.
Cold-finished steel, rounds and hexagons.....	4.00c.
Cold-finished steel, squares and flats.....	4.50c.
Steel Hoops.....	3.85c. to 4.15c.
Steel bands, No. 12 gage to 3/8-in., inclusive.....	3.60c. to 2.90c.
Spring steel.....	5.00c.
Black sheets (No. 24).....	4.35c.
Galvanized sheets (No. 24).....	5.20c.
Blue annealed sheets (No. 10).....	3.30c.
Diamond pattern floor plates—1/4-in.	5.30c.
3/8-in.	5.50c.
Rails.....	3.20c.
Swedish iron bars.....	6.60c.

terially, and there is considerable free iron for the remaining months of the year. Unless the pig iron melt at steel plants and foundries increases there will continue to be an oversupply for some time. The Baldwin Locomotive Works has bought 2500 tons of floor and cylinder iron for which it inquired a few weeks ago. A few other sales of foundry grades have ranged from 500 to 1000 tons.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$20.26 to \$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76 to 21.26
East. Pa. No. 1X.....	21.26 to 21.76
Basic (delivered eastern Pa.)....	20.00
Gray forge	20.50 to 21.00
Malleable	21.50 to 22.00
Standard low phos. (f.o.b. New York State furnace).....	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	24.50 to 25.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	25.54
Virginia No. 2X, 2.25 to 2.75 sil.	26.04

Prices, except on low phosphorus, are delivered Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Ferromanganese.—Going business is of small proportions. There is no change in the domestic or English price, which is \$90, seaboard.

Billets.—Sales are confined to small lots, on which quotations range from \$33 to \$34, Pittsburgh, for the rerolling grade and from \$38 to \$39, Pittsburgh, for forging quality.

Plates.—Business so far this month has been at a better rate than in August. Last week's orders were generally larger than in the preceding ten days of the month. Those Eastern mills which had been quoting 1.80c., Pittsburgh, on the general run of business, have adjusted their quotations to meet the price of 1.75c., Pittsburgh, announced by the Carnegie Steel Co. During the past week or two sales have been made in some instances at 1.70c., Pittsburgh, and there is nothing yet to indicate that this price has been withdrawn as affecting the more attractive orders. Not all mills, however, have gone that low.

Structural Shapes.—To what extent, if any, the announcement of the Carnegie Steel Co. that its minimum price on shapes is now 1.75c., Pittsburgh, will affect quotations by Eastern structural mills has not become clear. Under present conditions of small-lot buying there is no accepted definition of large orders and small orders; frequently the small order for the large producer is a large order for one of the smaller producers. Shapes have been available in carload lots at 1.70c. and 1.75c., Pittsburgh, and at this writing the lower figure has not disappeared. The practice of some mills in granting liberal concessions on large structural projects has carried prices to a basis of 1.60c., Pittsburgh, in extreme cases, and whether these concessions will be wiped out is one of the interesting developments that will be watched for.

Bars.—Independent makers of steel bars have generally adjusted their quotations to the basis of 1.75c., Pittsburgh, the figure announced by the Carnegie Steel Co. as its minimum price on large lots. The extent to which mills will insist on 1.80c. or 1.85c. on so-called small lots is yet to be determined. Although 1.80c., Pittsburgh, has consistently been referred to as the "market price" on steel bars for some time, it now becomes known that more business has been done at 1.75c. than was generally realized. Adjustment of price on bar iron to meet the 1.75c. quotation on steel bars may be expected. Bar iron has been quoted at 2.12c., Philadelphia, with concessions on the more desirable orders.

Sheets.—Not much has happened to change the price situation on sheets as compared with that of a week ago. Makers of blue annealed are meeting the competition of strip sheet mills on the sizes the latter roll, quoting 2.15c., Pittsburgh, when necessary; but on wider sheets they are usually getting 2.25c., Pittsburgh. Concessions of \$1 and \$2 a ton continue to appear in quotations on black sheets, but galvanized sheets have been sold at 3.85c. Weakness in the latter, if it exists, is not so clearly defined as in black sheets.

Warehouse Business.—Competition for orders by

jobbers is very keen and prices are suffering. Steel bars are the special subject of attack, but concessions also appear on structural shapes. In both of these products the competition of foreign steel is a factor. The volume of buying is less than at this time a year ago.

Imports.—Finished steel imports loom quite largely in each week's report. The amount that came in at Philadelphia last week was 556 tons, of which 257 tons of structural shapes came from France and 254 tons from Belgium, while 14 tons came from Germany. Steel bar imports amounted to 26 tons from Sweden and five tons from Belgium. Sweden also shipped 20 tons of iron bars. Other imports were 1853 tons of pig iron from India, 8100 tons of manganese ore from Russia and 2692 tons of chrome ore from Portuguese Africa.

Old Material.—The scrap market has almost stood still this week. The only activity of importance was the purchase of good-sized tonnages of machine shop turnings, bundled sheets, stove plate and grate bars by a steel company. For turnings and bundles \$11.50, delivered, was paid, and \$13.50 was paid for stove plate and grate bars. There is no demand for heavy melting steel, which is freely available at \$14, delivered.

Prices per gross ton, delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.....	\$14.00
Scrap T rails	\$13.00 to 13.50
No. 2 heavy melting steel.....	11.50 to 12.00
No. 1 railroad wrought.....	15.50 to 16.00
Bundled sheets (for steel works)	11.00 to 11.50
Machine shop turnings (for steel works)	11.00 to 11.50
Heavy axle turnings (or equivalent)	12.50 to 13.00
Cast borings (for steel works and rolling mill)	11.50 to 12.00
Heavy breakable cast (for steel works)	16.00
Railroad grate bars	13.00 to 13.50
Stove plate (for steel works)...	13.00 to 13.50
No. 1 low phos., heavy, 0.04 per cent and under	18.50 to 19.50
Couplers and knuckles.....	16.75
Rolled steel wheels.....	16.00 to 16.50
No. 1 blast furnace scrap.....	10.50
Machine shop turnings (for rolling mill)	11.50 to 12.00
Wrought iron and soft steel pipes and tubes (new specifications)	12.50 to 13.00
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	10.50 to 11.00
Steel rails for rolling.....	16.00 to 16.50
Cast iron carwheels	15.50 to 16.00
No. 1 cast	16.50 to 17.00
Cast borings (for chemical plant)	15.00 to 16.00

Cleveland

Steel Price Developments Confuse Buyers—Heavy Melting Declines

CLEVELAND, Sept. 20.—The announcement of a price of 1.75c. per lb., Pittsburgh, on steel bars, plates and shapes for large lots and 1.85c. for less-than-car lots means a reduction for some consumers and an advance for others, for the reason that a large share of buyers in this territory have been paying the price of 1.80c. that has been regularly quoted and certain consumers of round lots have been getting concessions from that price. Recently concessions from the regular price apparently have become more general, this being particularly true of prices quoted fabricators for structural material. It is contended that the establishment of the new prices will result in a stabilization of the

Warehouse Prices, f.o.b. Cleveland

Base per Lb.

Plates and structural shapes.....	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 3.00c.
Cold-finished rounds and hexagons.....	3.65c.
Cold-finished flats and squares.....	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.65c.
Blue annealed sheets (No. 10).....	3.25c.
No. 9 annealed wire, per 100 lb.....	\$2.90
No. 9 galvanized wire, per 100 lb.....	3.35
Common wire nails, base per keg.....	2.90

*Net base, including boxing and cutting to length.

market, providing the prices are adhered to. The new prices have been generally adopted.

The demand for steel, which was slack before the new prices came out, has been checked, as buyers seem somewhat confused by the developments in the price situation. Local mills, which have been quoting 1.80c., Cleveland, for steel bars, have adopted a price of 1.75c., Cleveland. However, they had taken some business recently at the latter price.

Steel shipments are being held back by some of the manufacturers of automobile parts because of the suspension of their orders by a manufacturer of low priced cars, and new business from the automotive industry is light. Nevertheless, a number of automobile makers in the Detroit territory have come in the market for fourth quarter contracts for sheets, strip steel and other products.

Pig Iron.—Buying was in moderate volume in the past week, sales for the most part having been confined to small lots. In the northern Ohio territory the market was very dull. Sales by Cleveland interests during the week aggregated 14,000 tons, or a little less than during the previous week. The effect of the slowing down in the automotive industry is becoming more noticeable, as there has been considerable curtailment in shipping orders for pig iron by some of the automobile foundries. Business with jobbing foundries in northern Ohio is dull. There is virtually no change from recent prices. For Cleveland delivery the market is holding to \$18.50, furnace, for foundry and malleable grades. While Lake producers recently have sold foundry and malleable iron at \$17, furnace, they claim now to be holding to \$17.50 and to be losing some business in the southern part of the State, where they have the competition of both Columbus and Ironton furnaces and where consumers are still able to buy at a delivered price equivalent to \$17, Lake furnace. One Valley producer is asking \$18, furnace, but \$17.50 appears to be more general in the Valley district. For delivery to some points in Michigan iron can still be bought at \$18, furnace, although one producer is on an \$18.50 basis.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25.....	\$19.00
Southern fdy., sil. 1.75 to 2.25.....	23.25
Malleable	19.00
Ohio silvery, 8 per cent	31.50
Basic, Valley furnace.....	17.00
Standard low phos., Valley furnace.....	27.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Iron Ore.—While shipments will show considerable falling off this month, ore firms state that there has been very little suspension of shipments under the schedules prepared by consumers early in the season. During August 4,368,101 gross tons of Lake Superior ore was consumed, an increase of 73,886 tons over July. During August, 1926, the amount consumed was 4,796,187 tons. On Sept. 1 there was 29,727,599 tons of ore on hand at furnaces. The amount of Lake Superior ore at furnaces and Lake Erie docks on the same date was 35,802,565 tons, as compared with 32,174,118 tons on the same date a year ago. Furnaces in the Central district during August consumed 2,174,792 tons of ore, an increase of 63,227 tons over July. Lake furnaces consumed 1,966,286 tons, a gain of 9708 tons, and all-rail furnaces used 148,596 tons, an increase of 6370 tons over the preceding month. Eastern furnaces consumed 78,427 tons or 5419 tons less than during July. On Aug. 31 there were 157 furnaces in blast using Lake ore, a decrease of one for the month.

Semi-Finished Steel.—A slight improvement is reported in specifications for sheet bars, but there is little new demand. There is little activity in wire rods, which range from \$42 to \$43, Cleveland.

Sheets.—Orders are slightly better than a few weeks ago, but buying is in small lots for early needs. The demand from the automotive industry continues light, and this is seriously affecting mill operations. Regular prices seem to be maintained in this territory except on blue annealed sheets, on which 2.15c., Pittsburgh, is appearing, these being affected by strip mill competition. Some business in black sheets has been taken from steel barrel manufacturers in this district

at the usual price of 3c., while galvanized sheets appear to be holding to 3.85c. in this territory. A price of 3.75c. is reported to have become quite general in the South.

Strip Steel.—Makers of cold-rolled strip steel have abandoned the system of quantity price differentials which has prevailed for some time, with a base price of 3.25c., Cleveland or Pittsburgh, for 1 to 3 tons, and have adopted a base of 3c. for 3 tons of a size and over. The effect of this change is to make the price for over 3 tons up to 18 tons the same as for larger lots instead of \$2 to \$3 a ton higher. The demand for both hot and cold-rolled strip steel continues slow, as not much business is coming from the automotive industry. Prices appear to be well maintained.

Cold-Finished Steel Bars.—A \$2 a ton reduction has been made from the regularly quoted price to 2.25c., Cleveland, and 2.20c., Pittsburgh. The market has been irregular for some time, business being taken at from \$1 to \$2 a ton under the established price.

Reinforcing Bars.—Little new inquiry is coming out. The revision in prices on billet steel bars has not resulted in any change in rail steel bars, which are quoted at 1.65c., mill.

Warehouse Business.—Sales are moderate. The volume being about the same as last month. The new mill prices have not been reflected in any revision of warehouse prices. The market shows firmness except on blue annealed sheets, on which concessions of \$2 to \$3 a ton are reported.

Coke.—Foundry heating coke is a little firmer and ranges from \$2.90 to \$3.25 per net ton, ovens. Conneltsville foundry coke is in very light demand and prices are unchanged at \$4 to \$5.35, ovens.

Bolts, Nuts and Rivets.—Demand for bolts and nuts continues light, and September business will show very little gain over that in August. While a fair number of consumers are now placing contracts for the fourth quarter, they are issuing very light specifications against third quarter contracts and it is evident that considerable contract tonnage will have to be cancelled at the end of this month. Rivet specifications are light. Some consumers are placing contracts for the fourth quarter at the present contract price of \$2.75 per 100 lb.

Old Material.—With little demand to support the market, prices are weak and heavy melting steel and blast furnace scrap have declined 25c. a ton during the week. Recent market prices have been \$14 for No. 1 heavy melting steel and \$11 for blast furnace scrap. Consumers are well supplied with scrap and are showing no interest in the market.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.....	\$13.75 to \$14.00
No. 2 heavy melting steel.....	13.25 to 13.50
Compressed sheet steel.....	13.25 to 13.50
Light bundled sheet stampings...	11.50 to 12.00
Drop forge flashings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.75 to 14.00
No. 1 busheling	11.50 to 11.75
Pipes and flues	10.00 to 10.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops...	16.50 to 17.00
Low phosphorus, billet bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops...	16.00 to 16.50
Low phosphorus plate scrap.....	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings.....	10.75 to 11.00
Mixed borings and short turnings	10.75 to 11.00
No. 2 busheling.....	10.75 to 11.00
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	12.00 to 12.50
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.50 to 16.00
Rails for rolling	16.25 to 16.50

Chicago district mill sales offices of the Jones & Laughlin Steel Corporation, Pittsburgh, have been moved from Lake and Canal Streets to the Conway Building, 111 West Washington Street. The warehouse sales office of the corporation is located at 2250 West Forty-seventh Street.

San Francisco

First Bethlehem Ship Docks on Coast — More Activity in Cast Pipe

SAN FRANCISCO, Sept. 17 (*By Air Mail*).—The award of 1000 tons of structural steel for an arena in San Francisco, taken by the Minneapolis Steel & Machinery Co., and the opening of bids on 1600 tons of cast iron pipe for Bellingham, Wash., were among the more important developments of the week. Trading in most lines was limited to unimportant tonnages. Prices, generally, are being well maintained. A tendency toward higher levels is prevalent in the cast iron pipe market.

The Cubore, the first of the new Calmar line ships to arrive from East Coast ports, docked at Los Angeles on the 12th with a steel cargo of approximately 7000 tons for delivery at Los Angeles, San Francisco and Seattle. The Calmar Steamship Corporation was recently organized as a subsidiary of the Bethlehem Steel Co.

Pig Iron.—Activity has been limited to inquiries and sales involving small tonnages. A local importer unloaded at Seattle this week about 100 tons of Indian pig iron. During the early part of next month 1250 tons of the same iron is due to arrive on the Coast and will be distributed at Los Angeles and San Francisco. Prevailing prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	\$25.00 to \$26.00
*Utah foundry, sil. 2.75 to 3.25 ..	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25 ..	25.00
**German foundry, sil. 2.75 to 3.25 ..	24.25

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Shapes.—Included among the larger lettings of structural material, in addition to the 1000 tons for an arena at San Francisco, were 520 tons for two berth sheds at Los Angeles, taken by the Union Iron Works, and 300 tons for transmission poles and towers for the Modesto Irrigation District, secured by the Pacific Coast Steel Co. Total bookings since the first of the year are nearly 25 per cent greater than the total for the same period last year. A sizable total is pending, most of which, it is expected, will be closed during the next 10 days or two weeks. Prices on plain material continue firm and unchanged at 2.40c., c.i.f. Coast ports.

Plates.—The plate market is at a standstill and is quieter now than it has been at any time in over a year. The few awards that were placed called for lots of less than 100 tons, the largest, 75 tons for pontoon pipe for the Port Commission at Oakland, having been booked by the Pacific Coast Engineering Co. Two local fabricators withdrew their inquiries for 900 tons of plates for use in fabricating welded steel poles because the purchaser decided on galvanized channel material. Prices continue at 2.40c., c.i.f. Coast ports.

Bars.—The bulk of the bar business, both as regards sales and inquiries, has been confined to lots of less than 50 tons. Included among the more important projects involving reinforcing steel were 520 tons for the Lovejoy viaduct at Portland, secured by the Northwest Steel Rolling Mill Co., 250 tons for a gymnasium at Moscow, Idaho, booked by the same company, and 375 tons for a warehouse for a furniture company at Los Angeles, taken by the Truscon Steel Co. Fresh inquiries include 135 tons for a bridge near San Bernardino. Ruling prices in the local market are as follows: 2.75c. to 2.85c. per lb. on lots of 200 tons or more and from 3c. to 3.10c. on less-than-carload lots.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.10c.
Small angles, $\frac{3}{8}$ -in. and over	3.10c.
Small angles, under $\frac{3}{8}$ -in.	3.60c.
Small channels and tees, $\frac{3}{8}$ -in. to 2 $\frac{3}{4}$ -in.	3.70c.
Spring steel, $\frac{1}{4}$ -in. and thicker	5.10c.
Black sheets (No. 24)	3.85c.
Blue annealed sheets No. 10)	4.90c.
Galvanized sheets (No. 24)	5.45c.
Structural rivets, $\frac{1}{2}$ -in. and larger	5.50c.
Common wire nails, base per keg	\$3.45
Cement coated nails, 100-lb. keg	3.45

Cast Iron Pipe.—Buena Park, Cal., has placed 269 tons of 8-in. Class B pipe with the Lana Construction Co. Sebastopol, Cal., has awarded 225 tons of 4 to 10-in. Class B pipe to Welch Brothers, and the Pacific States Cast Iron Pipe Co. has booked approximately 100 tons of 4 and 6-in. Class B pipe for Brentwood, Cal. Bids were opened on 1600 tons for Bellingham, Wash., this week, and the figures were referred to the engineer for tabulation. It is thought that higher prices will be disclosed on this project, when released for publication, than were quoted in the case of the 1300-ton inquiry of Pasadena last week, when as low as \$36 was named on 6-in. and larger Class B. Bids were also opened on 373 tons of 4 and 8-in. Class B for the improvement of South Main Street, Santa Ana, Cal.; on 315 tons for El Segundo, Cal., involving 4 to 10-in. Class B; on 191 tons for San Diego, Cal., for the improvement of Fifty-fourth Street, calling for 8 and 16-in. Class B; on 183 tons of 4 and 6-in. Class B for Santa Monica, Cal., and on 156 tons for the improvement of Saddle Peak Road, Los Angeles, requiring from 3 to 48-in. Class B pipe, on which the Chase Construction Co. was low bidder. Bids will be opened on Sept. 22 for 131 tons of 4 to 12-in. Class B pipe for the improvement of Park Avenue, Glendale, Cal.

Steel Pipe.—The only larger award reported this week for standard pipe involved 500 tons of standard black plain-end pipe, ranging from $\frac{1}{4}$ to 3 $\frac{1}{3}$ in., for the Western Harvester Co., Stockton, Cal., which was placed with unnamed Eastern interests. No action has yet been taken on an inquiry of the Santa Maria Gas Co. for 100 tons of 6 or 8-in. line pipe.

Coke.—One of the leading importers reports that a shipment of 4000 tons of English beehive and by-product coke is due to arrive at Los Angeles on Sept. 26. All of this material will not be discharged at the southern port, part of it being scheduled for this city. Foundry activity is by no means great, and as a result demand is, at times, spotty.

English beehive coke, \$15 to \$16 per net ton at incoming dock; English by-product \$12 to \$13, and German by-product, \$11.50 to \$12.

Toronto

More Interest Shown in Fourth Quarter Pig Iron — Rail Business in Sight

TORONTO, ONT., Sept. 20.—Interest in the Canadian pig iron market is growing more active as the third quarter draws to a close. A number of melters have entered the market for last quarter, and inquiries for spot shipment have also become more numerous. Advance buying has been fairly active of late, but with the prospect of higher prices in the early future, producers continue to discourage long term contracts and are not seeking orders other than those for immediate delivery. Some improvement was also reported in spot sales during the past few days. Whereas a month or six weeks ago the greater part of spot orders ranged from one to two cars, a large number of orders for immediate delivery closed during the last few days ranged from 100 to 200 tons, with several running as high as 500 or 600 tons. The general outlook for good business during the last quarter is promising. While there has been no actual change in pig iron prices, it is the belief of local blast furnace representatives that higher prices in the Buffalo market will be reflected in advances here.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	\$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60

Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	26.00
No. 2 foundry, sil. 1.75 to 2.25	26.00
Malleable	26.00
Basic	25.00

Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Rails.—While Canadian rail mills have sufficient business on hand for continued operations up to the close of October, they are now on the lookout for additional orders. Unofficial information is current that some big tonnages are to be placed by both the Canadian Pacific and Canadian National railroads for winter rolling. Orders recently placed by the Canadian National Railways include: 310 tons of splice bars, 115 tons of spikes, 141 tons of bolts, 14 tons of tie plates, 1200 rail anchors, 58,000 lock washers, for use on the Canadian lines; and 27 tons of bolts for use on the United States lines. The above order was divided among the Algoma Steel Corporation, the British Empire Steel Corporation, the Steel Co. of Canada, Ltd., the Canada Machinery Corporation, Hubbard & Co., the National Lock Washer Co., the Reliance Mfg. Co. and the United States Steel Corporation.

Old Material.—Improvement in business has failed to develop. Sales for the week were both light in number and small in tonnage. Advance buying has not been a strong feature of this market for some time, and present indications are that most consumers are still satisfied to adhere to the hand-to-mouth buying policy that has been in favor throughout the greater part of this year. While advance buying continues dull, there has been some slight improvement in spot sales. In such materials as heavy melting steel and machinery cast there is a steady demand in Ontario, while Quebec buyers appear to favor wrought scrap, wrought iron and steel axles, machinery cast and heavy melting steel. Montreal dealers report only minor transactions in export business. Orders against contract both in Toronto and Montreal markets are appearing regularly, and the movement of old material is fairly good. Prices are unchanged.

Dealers' buying prices:

	Toronto	Montreal
<i>Per Gross Ton</i>		
Heavy melting steel.....	\$9.50	\$9.00
Rails, scrap.....	10.00	10.00
No. 1 wrought.....	10.00	11.00
Machine shop turnings.....	7.00	6.00
Boiler plate.....	7.00	7.00
Heavy axle turnings.....	7.50	8.00
Cast borings.....	7.50	6.00
Steel turnings.....	7.00	7.00
Wrought pipe.....	5.00	6.00
Steel axles.....	14.00	19.00
Axles, wrought iron.....	16.00	21.00
No. 1 machinery cast.....	.....	17.00
Stove plate.....	.....	12.50
Standard carwheels.....	.....	16.00
Malleable scrap.....	.....	14.00
<i>Per Net Ton</i>		
No. 1 machinery cast.....	15.00	.....
Stove plate.....	9.00	.....
Standard carwheels.....	13.00	.....
Malleable scrap.....	13.00	.....

St. Louis

Reinforcing Bar Project to Take 5000 Tons—Scrap Market Breaks

ST. LOUIS, Sept. 20.—Unusually hot weather here and elsewhere is given as the cause for a marked decline during the week in sales of pig iron. The Granite City maker disposed of approximately 1600 tons. The heat had the effect of reducing the melt, as many plants were obliged to discontinue operations. In several instances men laid down their tools because they were unable to continue work. Shipments show a slight increase over the same period last month. Two

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-finished rounds, shafting and screw stock.....	3.75c.
Black sheets (No. 24).....	4.80c.
Galvanized sheets (No. 24).....	5.35c.
Blue annealed sheets (No. 10).....	3.60c.
Black corrugated sheets.....	4.65c.
Galvanized corrugated sheets.....	5.30c.
Structural rivets.....	3.60c.
Boiler rivets.....	3.80c.
<i>Per Cent Off List</i>	
Tank rivets, 7/16-in. and smaller.....	70
Machine bolts.....	60
Carriage bolts.....	60
Lag screws.....	60
Hot-pressed nuts, squares, blank or tapped.....	60
Hot-pressed nuts, hexagons, blank or tapped.....	60

sales of 500 tons each to Illinois melters were the principal transactions of the week. The largest current inquiry is for 1000 tons of foundry iron for a Kansas melter. Prices are unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b.	
Granite City, Ill.	\$19.50 to \$20.00
Northern No. 2 fdy., delivered	
St. Louis	21.66
Southern No. 2 fdy., delivered...	21.67
Northern malleable, delivered....	21.66
Northern basic, delivered.....	21.66

Freight rates: 81c. from Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Finished Iron and Steel.—The largest reinforcing bar project pending in this market for some time is the second unit of the River Des Peres sewer, which will require 5000 tons. Bids for the general contract will be opened by the St. Louis Board of Public Service on Sept. 27. Structural fabricators report that business is dull. Since mill operations have been curtailed because of the unusual heat, manufacturers of galvanized sheets find it difficult to satisfy delivery demands. The Texas & Pacific Railway is in the market for 100,000 tie plates. A few carload inquiries for track spikes and bolts also are coming from the railroads. Warehouse business is quiet.

Coke.—Unusually hot weather has not only reduced the consumption of coke, but has caused buyers to show a lack of interest in the future. However, shipments against contracts continue to equal production. Demand for domestic grades is slow.

Old Material.—Unable to interest consumers in the market, dealers have reduced their prices on a number of items, and the market generally is weak. The mills are awaiting purchases by the railroads, which, in turn are awaiting crop developments before placing any orders. Miscellaneous rails, railroad springs and rails for rolling are off 25c. a ton; short rails, railroad malleable and agricultural malleable have declined 50c. a ton; No. 1 railroad cast and No. 1 machinery cast have receded \$1.50 a ton. Only carload orders are being received for relaying rails. Railroad lists include: Rock Island, 8000 tons; St. Louis-San Francisco, 1100 tons; Texas & Pacific, 900 tons, and Gulf Coast Lines, 600 tons.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	\$12.25 to \$12.75
No. 1 locomotives tires.....	14.25 to 14.75
Heavy shoveling steel.....	12.25 to 12.75
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart.....	14.50 to 15.00
Railroad springs	15.00 to 15.50
Bundled sheets	8.50 to 9.00
No. 2 railroad wrought.....	12.25 to 12.75
No. 1 busheling.....	10.25 to 10.75
Cast iron borings	9.25 to 9.75
Iron rails	12.50 to 13.00
Rails for rolling.....	15.25 to 15.75
Machine shop turnings.....	6.75 to 7.25
Steel car axles	19.00 to 19.50
Iron car axles	23.50 to 24.00
Wrought iron bars and transoms.....	20.00 to 20.50
No. 1 railroad wrought	11.00 to 11.50
Steel rails, less than 3 ft.....	15.00 to 15.50
Steel angle bars	12.75 to 13.25
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast.....	13.50 to 14.00
Railroad malleable	13.00 to 13.50
No. 1 railroad cast.....	13.00 to 13.50
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under...	20.50 to 23.50
Relaying rails, 70 lb. and over...	26.50 to 29.00

Boston

Stronger Effort to Stiffen Pig Iron Prices—Shapes More Active

BOSTON, Sept. 20.—Pig iron prices are unquestionably stiffening in this territory, but the process is a slow one, as temporary weak spots are occasionally uncovered. The two Buffalo producers most active in the New England market are now quoting \$17, \$17.50 and \$18.50 a ton, furnace, for No. 2 plain, No. 2X and No. 1X respectively. Eastern New York State furnaces are quoting \$18 to \$19, base furnace, depending on the freight rate. On business taking a \$2 freight rate the Mystic Iron Works quoted \$19.50 to \$19.75 a ton, base, last week. That furnace has sold

upward of 7600 tons in the past fortnight. Reports that prices on Alabama iron are being shaded cannot be substantiated in New England. Eastern Pennsylvania and Virginia irons are being held at previous price schedules. Competition for business here is so keen and solicitations so frequent that there is a noticeable scarcity of open inquiries. Yet a fair volume of iron is being sold, bookings for the past week aggregating around 5000 tons, including one lot of 1000 tons of No. 2X, sold to a Massachusetts foundry for shipment during the remainder of 1927. Recent transactions include sales of Indian iron at a minimum of \$22 a ton on dock here, duty paid, and charcoal iron at \$24 a ton, furnace, or \$32.19, delivered New England.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25.....	\$20.91 to \$21.91
Buffalo, sil. 2.25 to 2.75.....	21.41 to 22.41
East Penn., sil. 1.75 to 2.25.....	23.15 to 23.65
East Penn., sil. 2.25 to 2.75.....	23.65 to 24.15
Virginia, sil. 1.75 to 2.25.....	26.21
Virginia, sil. 2.25 to 2.75.....	26.71
Alabama, sil. 1.75 to 2.25.....	24.16 to 26.02
Alabama, sil. 2.25 to 2.75.....	24.66 to 26.52

Freight rates: \$4.91 from Buffalo, \$3.65 from eastern Pennsylvania, \$5.21 all rail from Virginia, \$6.91 to \$8.77 from Alabama.

Coke.—Although it is said that the New England melt of iron is increasing, the movement of by-product foundry coke from New England ovens to foundries is expanding very slowly. A few foundries are stocking fuel in anticipation of higher prices, but most of them evidently are in no hurry to do so. Both the New England Coal & Coke Co. and the Providence Gas Co. have no difficulty in keeping up with foundry fuel requirements. They are selling coke at \$12 a ton, delivered, within a \$3.10 freight rate zone. Ovens in other States continue to take some business at delivered prices slightly under those quoted by New England ovens.

Shapes and Plates.—Business in the fabricated steel market grew quieter in the past week, with most of the lettings confined to lots of less than 100 tons. Most of the larger fabricating shops have sufficient business on their books to keep operating at the present rate through the major part of the last quarter. The market on plain material is firmer and more active, because fabricators are anticipating their last quarter requirements. Standard shapes, in attractive tonnages, can still be had at 1.70c. per lb., base Pittsburgh, but mills have obtained \$1 a ton more on some tonnages and 1.85c. on small orders. Plates are bringing 1.75c. to 1.80c., base Pittsburgh, and bars, 1.75c.

Imports.—During the first half of this month 703 tons of Indian pig iron and 234 tons of Dutch, a total of 937 tons, were received at this port, contrasted with 1583 tons imported in the first half of August, this year, and 320 tons, in the first half of September, last year. Ore imports consisted of 7900 tons of Bizerta and 9055 tons of Newfoundland, a total of 16,955 tons, which compares with 26,027 tons in the first half of last month and none in the first half of September, last year. September imports of Belgian cast iron pipe consisted of 550 pieces, the first received since July 27, when 534 pieces arrived from Antwerp. No pipe was received in September last year.

Old Material.—The movement of old material out of

New England remains on a limited scale; consequently there is little opportunity for prices to change. No. 1 heavy melting steel, bundled skeleton, forge scrap, cotton ties and chemical borings are perhaps the most active materials. A majority of plants using New England chemical borings, however, are closing, and a slump in local shipments is anticipated. While the range of prices on No. 1 heavy melting steel remains \$9 to \$9.50 a ton, \$9 really is the going quotation, \$9.50 being paid rarely.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$9.00 to \$9.50
Scrap rails	8.50 to 8.75
No. 1 railroad wrought.....	10.50 to 11.00
No. 1 yard wrought.....	9.00 to 9.50
Machine shop turnings.....	6.00 to 6.50
Cast iron borings (steel works and rolling mill).....	6.50 to 7.00
Bundled skeleton, long.....	6.00 to 6.50
Forge flashings	6.50 to 7.00
Blast furnace borings and turnings	5.75 to 6.00
Forged scrap	6.00 to 6.50
Shafting	13.50 to 14.00
Street car axles.....	17.50 to 18.50
Wrought pipe (1 in. in diameter, over 2 ft. long).....	8.00 to 8.50
Rails for rerolling.....	10.25 to 10.75
Cast iron borings, chemical.....	10.25 to 10.75

Prices per gross ton delivered consumers' yards:

Textile cast	\$15.00 to \$15.50
No. 1 machinery cast.....	15.50 to 16.00
No. 2 machinery cast.....	12.50 to 13.00
Stove plate	12.00 to 12.50
Railroad malleable	14.00 to 14.50

Youngstown

Independent Mills Follow Lead of Corporation in Price Changes

YOUNGSTOWN, Sept. 20.—Makers of bars and plates in this district have not yet fully recovered from the shock of the announcement out of New York that the Carnegie Steel Co. had named a price of 1.75c., base Pittsburgh, for bars, plates and shapes to large-lot buyers and of 1.85c., base, for small tonnages. Like other companies within the boundaries of the greater Pittsburgh district they have not found it necessary to go under 1.80c., Pittsburgh, even to the so-called preferential buyers in their natural territory and had been disposed to refrain from entering the highly competitive consuming districts. The first announcement of the change in the Carnegie schedule indicated that the new prices were advances over what had been done, and there naturally were a good many requests from customers as to why they had not been accorded the same price treatment. It later developed that announcement of the Steel Corporation was intended to be a straight price announcement and that the new prices were advances only in comparison with quotations which had resulted from sharp competition in the East for structural steel and with the prices that large structural steel fabricators and the railroad car and locomotive builders had enjoyed for some time.

Local companies will follow the change, since it clearly defines the large and small-lot prices, although also observing that where the line is to be drawn between large and small buyers is still as indefinite as it has been. While there is evidence of some increase in interest in sheets and there are pipe orders on the books of local mills that only await shipping instructions, it cannot be said that expectations of improved general business are being realized, and mill activities are still on the low basis of the past month or more.

In response to slightly increased sheet orders, mills depending on makers of sheet bars here are a little freer in their specifications, but as a general proposition, trading in semi-finished steel is still quiet. Unusually warm weather and the absence of frosts has helped the late canning crops and has brought a few extra orders for tin plate to the local maker, but that product cannot be described as being in very active demand. The motor car builders are not yet buying steel freely, and operations of strip and full-finished sheet mills are low. It is not generally credited that the failure of the new Ford car to reach the market is responsible for this situation, but rather that retail sales of automobiles, except of a few models, are below expectations.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes.....	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	4.05c.
Squares and flats	4.55c.
Toe calk steel	6.00c.

Cincinnati

New Low Price on Lake Pig Iron— Further Weakness in Scrap

CINCINNATI, Sept. 20.—With both sales and inquiries light, the pig iron market continues in a listless condition. Dealers estimate that the majority of consumers have not purchased fourth quarter iron and are waiting to ascertain to what extent their business will expand in the next few months before binding themselves to future commitments. At present foundry operations are slack, and many melters have considerable iron on their yards which will be carried over into October and possibly into November. Prices are not sufficiently firm to act as a spur to future buying, this factor having been influential in causing a postponement of action on the part of consumers within this territory. The Hooven, Owens, Rentzschler Co., Hamilton, Ohio, is reported to have bought 1500 tons of foundry iron from a northern Ohio furnace at less than \$17, base Cleveland, this transaction marking a dip to the lowest price level of the year. Southern Ohio producers are asking \$19, base Ironton, and are booking small tonnages at that figure. In Southern iron \$17.25, base Birmingham, is the price adhered to by all sellers in their solicitation of fourth quarter orders. Some irregularity, however, is reported at St. Louis, where shipment by river from Southern furnaces makes possible a delivered price which figures back on an all-rail rate to less than \$17.25. The Globe Stove Co., Kokomo, Ind., is inquiring for 1000 tons of foundry iron for fourth and first quarters, and the Louisville & Nashville is expected to buy 360 tons of Northern, 150 tons of Southern and 145 tons of charcoal iron. Inquiries for silvery iron include 150 tons of 7 per cent for a Cleveland company and 200 tons for a central Ohio consumer.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25....	\$20.89
So. Ohio malleable	\$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25...	20.94
Alabama fdy., sil. 2.25 to 2.75...	21.44
Tennessee fdy., sil. 1.75 to 2.25..	20.94
Southern Ohio silvery, 8 per cent	30.39

Freight rates: \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Reinforcing Bars.—Bids now are being taken on 300 tons of bars for the approaches to the new Chesapeake & Ohio bridge across the Ohio River at Cincinnati. An award of 250 tons for the American Druggists Fire Insurance Association building in this city is expected soon. Prices have declined in the past week, new billet bars being quoted at 1.75c. to 1.85c., base Pittsburgh, with the former figure applying only to sizable tonnages. Rail steel bars are selling at 1.65c. to 1.75c., base mill.

Warehouse Business.—In the first 20 days of September sales have declined about 10 per cent from the August level. Bookings in the past few days have been more plentiful, and there is a fair possibility that business during the remainder of the month will bring the total tonnage for September up to that of the previous month. Prices are firm and unchanged.

Finished Material.—While producers are optimistic

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes....	3.40c.
Bars, soft steel or iron.....	3.30c.
Reinforcing bars	3.30c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	3.35c.
Open-hearth spring steel.....	4.75c. to 5.00c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24)....	4.90c.
Blue annealed sheets (No. 10)..	4.60c.
Structural rivets	3.85c.
Small rivets .....	.65 per cent off list
No. 9 annealed wire, per 100 lb....	\$3.00
Common wire nails, base per keg....	2.95
Cement coated nails, base 100 lb. keg....	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-welded steel boiler tubes, 2-in.....	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.....	19.00
4-in.	39.00

about the outlook, sales in the past week have been only fair at best and it is not likely that a distinct betterment will occur in the immediate future. Consumers in most cases are operating at a moderate rate, and their present activities do not warrant forward buying of steel. Until the situation becomes more favorable, therefore, purchasers are expected to limit their expenditures to small quantities of material for current requirements. Furthermore, with the price trend still downward there is no incentive to contract for future needs. Bars, plates and shapes have declined \$1 a ton to 1.75c., base Pittsburgh, for attractive lots, but quotations on single carloads remain at 1.85c. The structural market continues active, the number of pending projects being large. Competition between fabricators, however, is keen, and almost all jobs have gone at low prices. Gas holder fabricators have well-filled order books, which will keep their shops busy for several months. There has been little change in sheets, the demand for which has sagged somewhat. Jobbers are carrying rather small stocks and have proved to be disappointing as a source of business. Sheet prices have been well maintained, blue annealed being steady at 2.25c., base Pittsburgh, galvanized at 3.85c. and black at 3c. In wire goods there has been no substantial change. The Big Four railroad is taking bids on locomotive and car axles, steel tubes and safe ends, common wire nails, woven wire fence and galvanized barbed wire, covering its fourth quarter requirements. This carrier also is to buy about 1100 tons of plates.

Coke.—Because of slack operations in the foundry trade the movement of by-product foundry coke this month shows a decline from that of August, although a slight increase in demand has occurred in the past few days. No improvement in specifications for foundry coke is anticipated until early in October. Consumers of Wise County and New River beehive foundry coke are accepting shipments on contract at a fairly good rate, but are not buying for forward delivery. The Louisville & Nashville is in the market for 850 tons of foundry coke, covering its fourth quarter needs. Prices are firm and unchanged.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, \$9.52 to \$9.64; Wise County coke, \$7.59 to \$8.09; New River coke, \$10.09 to \$10.59. Freight rates: \$2.14 from Ashland, Ky.; \$2.59 from Wise County and New River ovens.

Old Material.—That the recent inflation of the market by dealers was unwarranted by developments in the operations of consumers has become evident. Steel mills are taking only limited quantities of scrap on contract, and in some cases temporary suspension of deliveries has been requested. Cast iron grades are virtually at a standstill. The only increase in activity is in the South, where dealers, anticipating a renewal of buying by steel plants, bid high enough on railroad lists last week to secure an unusually large percentage of the total tonnage. Prices quoted below are mostly nominal, as transactions have not been numerous enough to subject the market to a real test.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	\$12.00 to \$12.50
Scrap rails for melting	13.00 to 13.50
Loose sheet clippings.....	9.00 to 9.50
Bundled sheets	9.50 to 10.00
Cast iron borings	8.50 to 9.00
Machine shop turnings	8.00 to 8.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.50 to 8.00
Rails for rolling	13.50 to 14.00
No. 1 locomotive tires.....	14.00 to 14.50
No. 1 railroad wrought.....	11.00 to 11.50
Short rails	17.50 to 18.00
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast.....	17.50 to 18.50
No. 1 railroad cast.....	14.00 to 14.50
Burnt cast	8.00 to 8.50
Stove plate	10.00 to 10.50
Brake shoes	10.00 to 10.75
Railroad malleable	12.50 to 13.00
Agricultural malleable	12.00 to 12.50

Only 5 per cent of the manufactured gas output of the United States was sold for industrial purposes in 1910, according to Harry C. Abell, former president, American Gas Association. In 1926 about 25 per cent of the total send-out went to industrial users. The increase in quantity was about 1500 per cent and more than 21,000 industrial and factory operations are being served by gas.

Birmingham

Better Prospects for Railroad Purchases of Steel — Pig Iron Quiet

BIRMINGHAM, Sept. 20.—With the policy of buying small lots against immediate needs still being practised by most pig iron consumers, the market continues unstable. Furnace interests are maintaining a base of \$17.25 per ton, but some iron is still going to furnace yards, with consumers holding their stocks of raw material at the minimum. It is intimated that the fourth quarter quotation will be on the present basis, but no sales have yet been announced. Unless there is a change in prices, no deviation from the present method of small-lot buying is expected. Purchasers, however, are beginning to press for immediate delivery, and this is interpreted in some quarters as the beginning of a slight improvement. Sales range from car-load lots to about 200 tons. While there are a few inquiries for lots as large as 500 tons, furnace interests report but little activity. Recently there have been 20 blast furnaces producing foundry iron, including stacks of two steel companies that entered the open market. Basic is quiet, with plenty on yards to meet all demands for some time.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.....	\$17.25
No. 1 foundry, 2.25 to 2.75 sil.....	17.75
Basic	17.25
Charcoal, warm blast	29.00

Finished Material.—Open-hearth furnace operation shows little improvement, with the Gulf States Steel Co. operating four of six furnaces and the Ensley and Fairfield works of the Tennessee Coal, Iron & Railroad Co. running at only a slightly better rate. Estimates of the railroads' requirements for 1928 have been encouraging. The Louisville & Nashville will receive 61,000 tons of rails from the Ensley works of the Tennessee Coal, Iron & Railroad Co., which has upward of 100,000 tons of rails on its books for rolling during the remaining months of this year. Fabricators report a slight slackening in building construction but are quoting on a fair number of contracts. There is better demand for wire and nails, but prices are unchanged. The Gulf States Steel Co. has begun work on a program for expanded production and diversification of products.

Cast Iron Pipe.—Producers are operating at about 75 per cent of capacity. Lettings, however, are not numerous and the market continues weak. While \$30 per net ton, base Birmingham, is openly quoted, it is admitted that sales have been made at \$29 and less. Some tonnage is still on the yards of producers.

Coke.—The market shows further strength, as contracts are still being booked for delivery during the next few months. Independent producers are watching production closely, and more ovens are scheduled to go into production about the middle of October. Foundry grade is still quoted at \$5.50 per net ton, Birmingham, for prompt shipment, while \$6 per ton is quoted for extended delivery.

Old Material.—Prices are still weak, but there is a fair volume of scrap moving. There is a slightly increased demand for heavy melting steel, and stove plate and No. 1 cast are not plentiful, so that prices on those grades are stronger.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel.....	\$10.50 to \$11.00
Scrap steel rails	12.50 to 13.00
Short shoveling turnings	8.50 to 9.00
Cast iron borings	8.50 to 9.00
Stove plate	13.00 to 14.00
Steel axles	16.00 to 17.00
Iron axles	16.00 to 17.00
No. 1 railroad wrought.....	11.00 to 12.00
Rails for rolling	13.00 to 14.00
No. 1 cast	14.00 to 15.00
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical.....	13.00 to 13.50

The National Association of Farm Equipment Manufacturers will hold its thirty-fourth annual convention at the Congress Hotel, Chicago, Oct. 12, 13 and 14.

Detroit

Fourth Quarter Steel Inquiries Issued — Ford Delay a Market Damper

DETROIT, Sept. 20.—Several of the leading automobile companies have sent out inquiries during the past few days for their steel requirements for the fourth quarter, and these are expected to result in considerable market activity this week. Owing to the unsettled condition in the automotive industry it is believed that car builders generally will buy less steel than they did for the corresponding period last year. These purchases will furnish a real test of the present quoted prices, particularly on sheets and hot and cold-rolled strip steel. The time that the Ford Motor Co. will get under production on its new models is still a considerable distance ahead, as much is still to be done before its first car can be turned out for the market. That the Ford models will not be out before time to display them at the New York automobile show has become a rather general belief. Consequently, the sales offices of the steel companies have again revised their expectations as to the amount of steel that the Ford company will take during the last quarter. The automobile situation, as it exists at present, indicates that the volume of business, particularly in sheets and strip steel, will scarcely be enough to fill up the mills and competition for fourth quarter tonnage is likely to be unusually keen.

While delayed in bringing out its new car, the Ford company has continued to manufacture pig iron and steel and has accumulated a very large stock of billets that it will convert later into bars for its cars. The Ford company has increased its steel-making capacity with the addition of another open-hearth furnace, which was lighted in the past week. The company now has eight open-hearth furnaces and two more under construction. On Sept. 15 the Ford company received at its docks at the Fordson plant the last of the 199 boats that it purchased from the Government for conversion into scrap. These boats have been arriving at the Ford plant since late in May last year and have been scrapped as received.

Current orders for steel from the automotive industry are rather light. Buying for some time has been of a hand-to-mouth character. While there is a little increase in the demand from some of the car builders, this is offset by the holding up of shipments by others who are cleaning up present stocks preparatory to bringing out new models. Suspension of steel shipments by the Chevrolet Motor Co., which recently sharply curtailed production, has resulted in holding back considerable tonnage.

Steel Bars, Plates and Structural Material.—New demand for steel bars is only moderate, and orders with some of the mills are lighter this month than in August. Building work has fallen off, resulting in a slump in the demand for structural steel. Mills have reduced their prices \$1 a ton to 1.75c., Pittsburgh, on steel bars, plates and shapes for round lots. However, before the reduction late in the week there were price irregularities, due to competition resulting from water shipments from Buffalo.

Alloy Steel.—The market is starting to take on a little more activity. Several of the automobile and parts manufacturers have sent out inquiries for the fourth quarter, these ranging in lots from 500 to 3000 or 4000 tons. These inquiries are now pending. Some of the alloy manufacturers have opened their books for the fourth quarter at the present prices. The market appears to be holding at recent quotations, and manufacturers state that prices are so low now that there is little probability that further reductions will be made.

Cold-Finished Bars.—Prices have been marked down \$2 a ton, following irregularities that have prevailed for some time. Present quotations are 2.10c., Chicago, for some of the round-lot buyers and 2.20c. for the usual run of orders. Sales are rather light.

Cold-Rolled Strip Steel.—Leading makers have issued new differentials on cold-rolled strip steel, which

will benefit many of the small-lot buyers, who have protested against paying \$5 a ton more than the large consumers. Under the old differentials, the minimum price of 3c. per lb. was allowed to buyers of 18 tons or over. Under the new differentials, buyers of 3 tons or over are allowed the 3c. price, or a reduction of 25c. per 100 lb. from the 3.25c. base. Under the sliding scale that has existed, the price has been 3.15c. for 3 to 10 tons and 3.10c. for 10 to 18 tons. The present extras on lots of less than 1 ton are unchanged. While regular prices on hot-rolled strip appear to be maintained, the market has not been tested on round-lot business and does not show a very firm tone on either hot or cold-rolled strip.

Sheets.—Irregularities in blue annealed sheets that started with sizes and gages with which hot-rolled strip competes have extended to the entire range of sizes and gages. In this market 2.15c., Pittsburgh, has become a rather common price, but it is fairly well established that one round lot was bought at 2.10c. Prices on black and automobile body sheets appear to be holding; one automobile manufacturer during the week placed a fair tonnage of the latter without securing a concession. Considerable business is in prospect in the form of inquiries for the fourth quarter. The Hudson Motor Car Co. purchased 2000 tons of blue annealed and automobile body sheets for early shipment, and a small lot was placed by the Ford company.

Allegheny Steel Co. Acquires Seamless Tube Plant

PITTSBURGH, Sept. 20.—The Allegheny Steel Co., Brackenridge, Pa., recently acquired the Delaware Seamless Tube Co., Auburn, Pa., near Reading. The plant of this company, described in THE IRON AGE, March 11, 1926, page 681, is equipped to produce hot-rolled and cold-drawn tubes up to 3½ in. outside diameter, with wall thicknesses from 1 in. down to ¼ in.

The new owners are making some changes in the plant and will devote it primarily to the manufacture of alloy steel tubing, although continuing to make the products of the old company. The Allegheny Steel Co. has long been engaged in making welded tubes and in recent years has been marketing seamless tubing made for it by another company.

Rogers-Brown Iron Co. Receivership

BUFFALO, Sept. 20.—A voluntary petition in bankruptcy was filed Thursday in Federal Court here by the Rogers-Brown Iron Co., manufacturer of pig iron with a plant in this city. The move was authorized by the board of directors, which met on Wednesday, and was communicated to William S. Rogers, president of the company.

In accordance with the amended bankruptcy law of 1926, the schedule of liabilities and assets was not filed with the petition. It will be filed within 10 days from the date of the petition. John P. Abbott and E. J. Barcalo have been appointed temporary receivers and will continue the business under the authorization of the courts until a trustee is elected by the creditors.

Meanwhile a committee formed to protect the interests of holders of 20-year general and refunding mortgage 7 per cent gold bonds on the Rogers-Brown Iron Co. has in its hands slightly less than 75 per cent of the issue, which has been accepted as sufficient to bind an offer of \$400 in cash on each \$1,000 bond deposited. The bonds are being bought by another pig iron producer preparatory to acquisition of the Rogers-Brown furnaces.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes.....	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons.....	4.45c.
Rounds	3.95c.
Cold rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.30c.
Galvanized sheets (No. 24).....	5.15c.
Blue annealed sheets (No. 10).....	3.80c.
Common wire nails, base per keg.....	\$3.65
Black wire, base per 100 lb.....	3.90

Buffalo

Pig Iron Quiet—Good Demand for Concrete Bars—Scrap More Active

BUFFALO, Sept. 20.—The pig iron market is quiet, though the recent advances in prices appear to be holding. It is doubtful if \$16, furnace, could be done on any kind of a tonnage, and the few small lots that have been sold have brought \$17. One furnace interest sold 500 to 600 tons of foundry iron at \$17, with differentials. This producer has booked about 90,000 tons in the past two and one-half months. Some sales of small lots of malleable are reported at \$17.50. One of the steel-making interests which has been active in selling pig iron has advanced its price to \$17, base furnace, on foundry, thereby strengthening the market considerably.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25...	\$16.50 to \$17.00
No. 2X foundry, sil. 2.25 to 2.75...	17.00 to 17.50
No. 1X foundry, sil. 2.75 to 3.25...	18.00 to 18.50
Malleable, sil. up to 2.25.....	16.50 to 17.50
Basic	16.50 to 17.00
Lake Superior charcoal.....	27.28

Finished Iron and Steel.—There is a good demand for reinforcing bars. Foundations for the Buffalo City Hall will require 400 tons. A theater at Rochester, N. Y., calls for 150 tons. An award of 120 tons for municipal pier work in Buffalo has been made to a local maker. The market in fabricated structural steel is quiet, although a few small jobs are being figured. In the sheet market prices are firm and the demand for automobile body material is increasing. There is a good demand for wire and wire cloth, Buffalo manufacturers of which have been busy most of the summer. Nut and bolt business is good under the new price list, and plant operations are fair.

Old Material.—One local consumer has bought between 15,000 and 20,000 tons of heavy melting steel, hydraulic compressed sheets and No. 1 busheling at prevailing prices. Another consumer, which had suspended shipments up to a short time ago, continues to take material in a restricted way, but not freely enough to cause dealers to be anxious to purchase against its orders. A few orders for knuckles and couplers and coil springs have gone through, and there has been a sale of short rails at \$16.75, delivered to consumer's yards—a direct sale from a rerolling mill. There has been some buying of machine shop turnings around \$9.50. The market for stove plate and No. 1 machinery cast is very quiet.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.....	\$14.75 to \$15.00
No. 2 heavy melting steel.....	14.00 to 14.25
Scrap rails	14.50 to 15.00
Hydraulic compressed sheets.....	12.25 to 12.50
Hand-bundled sheets	9.90 to 9.50
Drop forge flashings	11.50 to 12.00
No. 1 busheling	13.00 to 13.25
Heavy steel axle turnings.....	12.75 to 13.25
Machine shop turnings	9.25 to 9.50
Acid Open-Hearth Grades	
Railroad knuckles and couplers...	15.75 to 16.25
Railroad coil and leaf springs...	17.00 to 17.50
Rolled steel wheels	15.75 to 16.25
Low phosphorus billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings.....	12.75 to 13.25
Short shoveling steel turnings...	10.75 to 11.00
Blast Furnace Grades	
Short shoveling steel turnings...	10.75 to 11.00
Short mixed borings and turnings...	9.75 to 10.00
Cast iron borings	10.00 to 10.50
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	15.00 to 16.00
No. 1 railroad wrought	13.00 to 13.50
Cupola Grades	
No. 1 machinery cast.....	15.25 to 15.75
Stove plate	13.50 to 14.00
Locomotive grate bars.....	11.00 to 11.50
Steel rails, 3 ft. and under.....	16.50 to 17.00
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Railroad	15.00 to 15.50
Agricultural	15.00 to 15.50
Industrial	15.00 to 15.50

The sixth annual convention of the American Construction Council will be held in St. Louis at the Hotel Statler, Dec. 1, 2 and 3.

NON-FERROUS METAL MARKETS

**The
Week's
Prices**

Cents per Pound
for
Early Delivery

	Sept. 20	Sept. 19	Sept. 17	Sept. 16	Sept. 15	Sept. 14
Lake copper, N. Y.	13.25	13.25	13.25	13.25	13.25	13.25
Electrolytic copper, N. Y.* ..	13.00	13.00	13.00	13.00	13.00	13.00
Straits tin, spot, N. Y.	61.50	61.50	...	62.12½	62.25	62.25
Lead, New York	6.25	6.25	6.25	6.25	6.25	6.25
Lead, St. Louis	6.00	6.00	6.00	6.00	6.00	6.00
Zinc, New York	6.57½	6.57½	6.60	6.60	6.60	6.60
Zinc, St. Louis	6.22½	6.22½	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Sept. 20.—Copper buying for export was large, and this, coupled with fair domestic business, strengthened but did not raise prices. Tin is in good supply and prices have weakened. Lead and zinc are quiet, with prices virtually unchanged. Antimony is slightly easier.

Copper.—Sales of copper for export by the Copper Export Association totaled 15,000 or 16,000 tons during the past week. Domestic sales at the same time were fairly large. Electrolytic copper sales were at 13.25c., delivered Connecticut Valley, and at 13.50c. per lb., delivered European ports, for exports. The business taken by some producers has placed them in a comfortable position, and they are not anxious at the moment for more business at 13.25c. Some quotations of 13.37½c. have appeared. Wire makers were conspicuous among the domestic buyers, as they have purchased very little of late. Most of the business had been completed by the end of last week, and this week opened with only a small amount of buying. A comparison of world production of copper for the eight months ended Aug. 31 shows that 1,089,061 tons had been produced in that period of 1927 (an average of 4482 tons a day, or 136,133 tons a month) as against 1,060,491 in the corresponding eight months of 1926 (an average of 4385 tons a day, or 133,374 tons a month).

Tin.—Prices have declined from 62.25c. per lb. quoted a week ago to 61.50c., the ruling figure at the close of business today (Tuesday). The weakness is due to a liberal supply and declining demand. The

falling off in consumption by the tin plate industry and the automobile industry, the largest and second largest consumers respectively, has left a wider gap between total consumption and the available supply than has existed at any time this year. The change in the situation as compared with the early months of the year is shown by the fact that a premium of 4c. per lb. was obtainable some months ago for prompt delivery, whereas the present spread between spot tin and that offered for December delivery is only ¾c. per lb. The December price of 61.12½c. per lb. is below the present estimated import cost. The opinion in the trade is that consumption is not only declining, but will decline further during the remaining months of the year. The requirements of the tin plate and automobile industries do not exceed 65 or 70 per cent of what they took earlier in the year. In the eight months from Jan. 1 to Aug. 31, this year, the United States has received 50,175 tons of tin, as compared with 53,615 tons in the same period in 1926. Despite this falling off in business done here, shipments from the Straits in the same eight months were larger this year by 2411 tons. Last year's shipments (eight months) were 49,600 tons, while 52,011 tons was shipped in the same period this year. The present visible supply is 14,500 tons; the highest of the year was 15,638 tons in June. London cable quotations today were: Spot standard, £279 15s.; future standard, £276; spot Straits, £285 15s.; Singapore, £280 15s.

Lead.—There has been a fair demand for lead, sufficient to give the market a degree of strength. Quotations remain at the level announced Sept. 9 by the American Smelting & Refining Co., namely 6.25c., New York, with some sellers asking up to 6.35c.

Zinc.—While there is no outstanding activity in zinc, the day-to-day buying is in fair volume. However, the production of Joplin ore is increasing, last week's

Metals from New York Warehouse Delivered Prices Per Lb.

Tin, Straits pig	63.50c. to 64.50c.
Tin, bar	65.50c. to 66.50c.
Copper, Lake	14.50c.
Copper, electrolytic	14.25c.
Copper, casting	13.75c.
Zinc, slab	7.50c. to 8.50c.
Lead, American pig	7.50c. to 8.50c.
Lead, bar	9.75c. to 10.75c.
Antimony, Asiatic	12.50c. to 13.50c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure) ..	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy ..	26.00c. to 27.00c.
Babbitt metal, commercial grade ..	30.00c. to 40.00c.
Solder, ½ and ¼	40.50c. to 41.50c.

Metals from Cleveland Warehouse Delivered Prices Per Lb.

Tin, Straits pig	67.50c.
Tin, bar	69.50c.
Copper, Lake	14.00c.
Copper, electrolytic	14.00c.
Copper, casting	13.25c.
Zinc, slab	7.75c.
Lead, American pig	7.25c.
Antimony, Asiatic	18.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	21.75c.
Babbitt metal, high grade	73.25c.
Solder, ½ and ¼	39.00c.

Rolled Metals from New York or Cleveland Warehouse Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.25c. to 19.00c.
Copper, hot rolled	22.00c. to 23.00c.
Copper, cold rolled, 14 oz. and heavier ..	24.25c. to 25.25c.

Seamless Tubes—	
Brass	23.12½c. to 24.12½c.
Copper	24.00c. to 25.00c.
Brazed Brass Tubes—	
Brass rods	26.25c. to 27.25c.
Brass rods	16.00c. to 17.00c.

From New York Warehouse	
Delivered Prices, Base Per Lb.	
Zinc sheets (No. 9), casks	10.50c. to 11.00c.
Zinc sheets, open	11.00c. to 11.25c.

Non-Ferrous Rolled Products

There has been no change in prices, and business continues quiet. Bronze, brass and copper products have not been changed since Aug. 3, zinc sheets since Aug. 5, and lead full sheets since Sept. 9.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to
75c. per 100 Lb. Allowed on Shipments
of 500 Lb. or Over

Sheets	
High brass	18.25c.
Copper, hot rolled	22.00c.
Zinc	10.00c.
Lead (full sheets)	10.00c. to 10.25c.

Seamless Tubes—	
High brass	23.12½c.
Copper	24.00c.

Rods—	
High Brass	16.00c.
Naval brass	18.75c.

Wire—	
Copper	15.25c.
High brass	18.75c.

Copper in Rolls	21.00c.
Brazed Brass Tubing	26.25c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of the Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide ..	35.50c.
Tubes, base	45.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	19.25c.
Copper, hot rolled	22.00c.
Copper, cold rolled, 14 oz. and heavier	24.25c.
Zinc	11.00c.
Lead, wide	10.25c.
Seamless Tubes—	
Brass	24.62½c.
Copper	25.50c.
Brazed Brass Tubes	28.50c.
Brass Rods	16.00c.

output totaling 14,800 tons with only 13,000 tons disposed of; hence stocks there are piling up, and this has a tendency to weaken the market. Up to the end of last week quotations were fairly well maintained at 6.25c., St. Louis, but the first two days of this week brought concessions. Sales were made at 6.22½c., with nothing to indicate that this price would hold.

Antimony.—The market is quiet and prices are weaker. Today's quotations were 11c., duty paid New York, for spot and 11.12½c. for future.

Aluminum.—Quotations are unchanged at 26c. per lb. for virgin metal, 99 per cent pure, and 25c. for the metallurgical product.

Nickel.—Ingot nickel is quoted at 35c. and shot nickel at 36c.

Non-Ferrous Metals at Chicago

CHICAGO, Sept. 20.—Sales of all commodities except antimony are in larger volume. The price of lead has advanced, but tin is quoted at a lower price notwithstanding that sales have been active. The old metal market is without feature.

Prices, per lb., in carload lots: Lake copper, 13.35c.; tin, 63.50c.; lead, 6.15c.; zinc, 6.35c.; in less-than-carload lots, antimony, 13c. On old metals we quote copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 6.75c.; lead pipe, 5c.; zinc, 3.50c.; pewter, No. 1, 34c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 13.25c.; all being dealers' prices for less-than-carload lots.

FABRICATED STRUCTURAL STEEL

Awards Total Close to 27,000 Tons—Inquiries Less Than 9000 Tons

Structural steel awards of 27,000 tons included 5300 tons for a woman's club building in New York and a number of projects ranging from 1000 to 1500 tons. The new work up for bids totals less than 9000 tons, of which 3200 tons is for a Government building in New York. Awards follow:

MINNEAPOLIS, 800 tons, substructure for the Foshay Tower building, to Minneapolis Steel & Machinery Co.
BOSTON, 470 tons, Burdett Business School, to Levering & Garrigues Co.
ROCKLAND, MASS., 125 tons, high school, to New England Structural Co.
HARTFORD, CONN., 500 tons, Hartford National Bank, to Levering & Garrigues Co.
HARTFORD, 600 tons, St. Thomas Seminary, to an unnamed fabricator.
NEW YORK, 1300 tons, apartment building on East Sixty-eighth Street, to Harris Structural Steel Co.
NEW YORK, 1000 tons, apartment building on Eighty-sixth Street, to Harris Structural Steel Co.
NEW YORK, 5300 tons, Woman's Club Building, to A. E. Norton, Inc.
NEW YORK, 1000 tons, addition to Fordham Hospital, to Hinkle Iron Co.
NEW YORK, 1500 tons, apartment building at Fifth Avenue and Seventy-seventh Street, to Paterson Bridge Co.
NEW YORK, 1000 tons, American Railway Express building in the Bronx, to Jones & Laughlin Steel Corporation.
NEW YORK, 800 tons, building for Federation of Jewish Philanthropies, to Taylor-Fichter Steel Construction Co.
BROOKLYN, 250 tons, substation for Brooklyn Edison Co., to American Bridge Co.
BROOKLYN, 350 tons, turbine foundation for Brooklyn Edison Co., to McClintic-Marshall Co.
AMSTERDAM, N. Y., 250 tons, First National Bank, to Williams Bridge Co.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	11.25c.	12.75c.
Copper, heavy and wire	11.00c.	12.00c.
Copper, light and bottoms	9.50c.	10.50c.
Brass, heavy	7.00c.	8.50c.
Brass, light	5.50c.	7.25c.
Heavy machine composition	8.75c.	10.125c.
No. 1 yellow brass turnings	7.75c.	8.25c.
No. 1 red brass or composition turnings	8.00c.	9.00c.
Lead, heavy	5.125c.	5.375c.
Lead, tea	4.25c.	4.75c.
Zinc	4.00c.	4.50c.
Sheet aluminum	13.50c.	15.50c.
Cast aluminum	13.50c.	15.50c.

CAMDEN, N. J., 800 tons, vocational school, to Jones & Laughlin Steel Corporation.
PHILADELPHIA, 1200 tons, apartment building, to McClintic-Marshall Co.
ATLANTIC CITY, 250 tons, Jefferson Hotel addition, to Jones & Laughlin Steel Corporation.
HOPEWELL, VA., 1000 tons, building for Atmospheric Nitrogen Co., to Virginia Bridge & Iron Co.
GEORGIA & FLORIDA RAILROAD, 900 tons, bridge in South Carolina, to Virginia Bridge & Iron Co.
BEAUMONT, TEX., 700 tons, power house for Gulf States Utilities Co., to Petroleum Iron Works.
LOUISVILLE, KY., 700 tons, Loew's Theater, to Massillon Bridge & Structural Co.
MICHIGAN CENTRAL RAILROAD, 200 tons, Bad River, Mich., bridge, to American Bridge Co.
FLINT, MICH., 1600 tons, factory building for Chevrolet Motor Co., to Whitehead & Kales.
CHICAGO, 1600 tons, Madison-Clark Building, to Duffin Iron Co., local.
VIROQUA, WIS., 380 tons, bridge over Bad Axe River, to Lakeside Bridge & Steel Co.
WISCONSIN RAPIDS, WIS., 100 tons, addition for Consolidated Water Power & Paper Co., to Worden-Allen Co.
MILWAUKEE, 105 tons, addition for Seaman Body Corporation, to Worden-Allen Co.
SAN FRANCISCO, 1000 tons, arena, to Minneapolis Steel & Machy. Co.
LOS ANGELES, 520 tons, berths 228 D and E, to Union Iron Works.
MODESTO, CAL., 300 tons, transmission line for Modesto Irrigation District, to Pacific Coast Steel Co.
MONROE, WASH., 295 tons, cell house for reformatory, to Wallace Bridge & Structural Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

CLEVELAND, 200 tons, operating station for Cleveland Railway Co.
BUFFALO, 300 tons, Buick automobile service station.
CLEVELAND, 200 tons, plant for Habermann Provision Co.
STATE OF MAINE, 500 tons, highway bridge.
BOSTON & MAINE RAILROAD, 300 tons, bridge.
NEW YORK, 3200 tons, column cores for United States Appraisers' Stores at Varick and Hudson Streets.
NEW YORK, 600 tons, apartment building on Seventy-ninth Street.
NEW YORK, 700 tons, apartment building on Ninety-sixth Street.
BROOKLYN, 600 tons, preparatory school at Nostrand Avenue and Carroll Street.
BROOKLYN, 1500 tons, boiler house for National Sugar Refining Co.
NEW YORK CENTRAL RAILROAD, 150 tons, bridge at Syracuse, N. Y.
PHILADELPHIA, 1000 tons, apartment building on Chestnut Street.
LEHIGH VALLEY RAILROAD, 375 tons, bridge at Newark, N. J.
BALTIMORE & OHIO RAILROAD, 750 tons, bridge at Middletown, Ohio.
WASHINGTON, 300 tons, building for U. S. Bureau of Standards.
WEST PULLMAN, ILL., 600 tons, building for Columbia Mills, Inc.
GRANITE CITY, ILL., 100 tons, factory building for National Enameling & Stamping Co.
EAST ST. LOUIS, ILL., 200 tons, factory building, General Chemical Co.
SAN FRANCISCO, 220 tons, hangar at Millbrae, Cal.; Stephenson Construction Co. low bidder.

REINFORCING STEEL

Awards Exceed 4800 Tons and New Work Up for Bids Is 12,000 Tons

The week's awards of concrete reinforcing steel amounted to a little more than 4800 tons, the largest item being 900 tons for a bridge at Harrisburg, Pa. Included among new projects totaling about 12,000 tons are two of unusual size, 5000 tons for a sewer in St. Louis and 3000 tons for a Government building in New York. Awards follow:

HARRISBURG, PA., 900 tons, Soldiers' and Sailors' Memorial Bridge, to A. Taylor Co., Philadelphia.
ASBURY PARK, N. J., 100 tons, Y. M. C. A. building, to Igoo Brothers.
WESTFIELD, N. J., 200 tons, county road work, to Igoo Brothers.
NEW YORK, 100 tons, two public schools, one in the Bronx, the other in Queens, to Fireproof Products Co.
CHICAGO, 200 tons of rail and billet steel bars for an apartment building, to Olney J. Dean & Co.
ROCKFORD, ILL., 300 tons, bridge, to Olney J. Dean & Co.
STAMFORD, CONN., 100 tons, bank, to Edwin A. Tucker Co., Boston.
BUFFALO, 120 tons, to a Buffalo maker.
COOK COUNTY, ILL., 200 tons of rail steel for road work, to Calumet Steel Co.
CHICAGO, 500 tons of rail steel, apartment building at 101 East Delaware Place, to Calumet Steel Co.
CHICAGO, 100 tons of rail steel, Englewood Masonic Temple to an unnamed bidder.
CHICAGO, 130 tons of rail steel, apartment building for Rune & Sons to Joseph T. Ryerson & Son.
CHICAGO, 175 tons, Garfield Park store room, to the Jones & Laughlin Steel Corporation.
CHICAGO, 100 tons, Lutheran Orphanage, to Joseph T. Ryerson & Son.
MILWAUKEE, 300 tons, Coakly Brothers Warehouse, to the Concrete Engineering Co.
MOSCOW, IDAHO, 250 tons, gymnasium, to Northwest Steel Rolling Mills Co.
PORTLAND, ORE., 520 tons, Lovjoy viaduct, to Northwest Steel Rolling Mills Co.
LOS ANGELES, 375 tons, warehouse at Twelfth Street, to Truscon Steel Co.
SAN RAFAEL, CAL., 140 tons, Chileno Valley bridge, to an unnamed interest.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 3000 tons, United States Appraisers' Stores.
NEW YORK, 250 tons, loft building on East Forty-seventh Street; general contract awarded to Fisher-Williams Corporation.
NEW YORK, 600 tons, barracks at Mitchell Field, L. I., 300 tons; barracks at Fort Wadsworth, S. I., 300 tons; bids due on general contract Sept. 23.
JERSEY CITY, N. J., 1500 tons, American Can Co. plant.
BOSTON, 570 tons, Gainsboro Street garage, previously reported as 300 tons.
BUFFALO, 400 tons, foundations for new City Hall; plans out this week.
ROCHESTER, N. Y., 150 tons, Keith-Albee Theater; being figured.
CINCINNATI, 300 tons, approaches to Chesapeake & Ohio bridge across Ohio River.
CINCINNATI, 250 tons, American Druggists Fire Insurance Association building.
OAK PARK, ILL., 100 tons, Central Plaza Hotel.
PULLMAN, ILL., tonnage being estimated, theater.
PULLMAN, ILL., tonnage being estimated, building for Columbia Mills, Inc.
HARVEY, ILL., tonnage not stated, hotel.
ST. LOUIS, 5000 tons, second unit of River Des Peres sewer.
SACRAMENTO, CAL., 135 tons, Warm Creek bridge near San Bernardino; bids Oct. 10.

Railroad Equipment

The Southern Pacific has ordered six baggage-mail cars from the Pullman Car & Mfg. Corporation.

The New River & Pocahontas Consolidated Coal Co. has ordered 150 mine cars from the American Car & Foundry Co.

The Illinois Central is in the market for two air dump cars.

Anti-Dumping Case on Steel to Be Decided Soon

WASHINGTON, Sept. 20.—The decision of the Treasury Department in connection with the petition of domestic iron and steel producers for application of the Anti-Dumping Act against imports from Europe, particularly Germany, is not expected to be given out until after the return to Washington next Monday of Commissioner E. W. Camp of the Division of Customs. The finding was prepared about 10 days ago and sent to officials of the Treasury Department, including Secretary A. W. Mellon, and it is reported that after examining it they returned it to the Customs Division for reconsideration. Unverified reports were to the effect that the decision was favorable to domestic producers. The significance of its return to the customs division for further consideration has been given various interpretations.

August Automobile Production Above July but Below Last Year

WASHINGTON, Sept. 20.—Production of motor vehicles in August, by members of the National Automobile Chamber of Commerce, totaled 303,040, of which 271,325 were passenger cars and 31,715 were trucks, according to reports to the Department of Commerce. Except for August, the data presented by the department are based on figures received from 153 manufacturers in the United States for recent months, 53 making passenger cars and 118 making trucks, 18 including both passenger cars and trucks. Figures for passenger cars include taxicabs and those for trucks include ambulances, funeral cars, fire apparatus, street sweepers and buses.

Revised figures for July show 263,239 motor vehicles for the United States, of which 233,384 were passenger cars and 29,855 were trucks. Canadian production in July was 10,987, including 8719 cars and 2268 trucks. August figures are not yet reported.

Compared with August, 1926, the current American figures show a drop of 28.6 per cent in passenger cars and of 24.5 per cent in trucks. For the eight elapsed months of the year there has been a decline of 17.5 per cent in passenger cars (from 2,767,706 to 2,283,387 units) but of only 1.6 per cent in trucks (from 314,863 to 309,767).

British Empire Corporation Sells 1928 Ore Output

Announcement was made Friday, Sept. 16, by the British Empire Steel Corporation that the 1928 output of its Bell Island iron mines, Newfoundland, estimated at 1,300,000 tons, has been sold. Of this amount, 800,000 tons will go to Germany, 400,000 tons to the company's furnaces in Nova Scotia, and 100,000 tons to the United States. The company has been shipping iron ore to Germany for several years, as well as to the United States. It is believed that the 100,000 tons mentioned as going to the United States has been contracted for by the Mystic Iron Works, Everett, Mass., and the Delaware River Steel Co., Chester, Pa.

British Steel Rebates

Twenty-eight leading British iron and steel manufacturers have adopted a rebate system for domestic buyers who will agree to buy only British material. The success of the arrangement, which went into effect Sept. 1, is variously reported. It is believed in Washington that this move will have slight (if any) effect on American steel exports, as it seems to be aimed at keeping out large tonnages from the Continent.

Details of the scheme, which are crowded out of this week's issue, will be published next week.

The Novelty Mfg. Co., Waterbury, Conn., maker of bathroom fixtures, is to be sold, according to present plans, to Charles E. Beardsley, president Risdon Mfg. Co.

PERSONAL

Robert S. Quinn, master mechanic Mingo works and furnaces Carnegie Steel Co., Mingo Junction, Ohio, has been made assistant general superintendent, succeeding



ROBERT S. QUINN

George W. Vreeland, who recently resigned to become assistant general manager Weirton Steel Co., Weirton, W. Va. Hugh B. Conover, who has been superintendent electrical department, has been made master mechanic in charge of the mechanical and electrical departments. Mr. Quinn has been at the Mingo works since 1890, having been successively machinist's apprentice, shop foreman, assistant master mechanic and master mechanic. He was born in Bellaire, Ohio, and upon graduating from high school he took up the study of mechanical engineering while a craneman at the plant. Mr. Conover

was born in Red Bank, N. J., and was graduated from Cornell University as mechanical and electrical engineer. For a time he was connected with the General Electric Co. He joined the Carnegie company Sept. 1, 1912, as superintendent electrical department at Mingo.

Neil C. Lamont, since 1925 manager of the Harrison, N. J., works of the Worthington Pump & Machinery Corporation, has resigned. His business career started in 1900, with the Cincinnati works of the International Steam Pump Co., predecessor of the Worthington company. In 1917 he succeeded the late William Goodman as manager of the Cincinnati works. In 1923 he was placed in charge of the Power and Mining works of the corporation at Cudahy, Wis., and continued in charge until the following year, when the crusher and mining machinery line was disposed of to the Allis Chalmers Mfg. Co., Mr. Lamont being transferred to New York as assistant to vice-president in charge of engineering and manufacturing.

Luther H. Bosnian has been appointed superintendent of the Park Street plant of the Chain Belt Co., Milwaukee, manufacturer of Rex conveyors, traveling water screens, chain and concrete mixers. He is a graduate of the Sheffield Scientific School, Yale University, and has been connected with the company's production department for the past eight years. Previous to this he was with the Westinghouse Electric & Manufacturing Co.

Forrest E. Cardullo, chief engineer G. A. Gray Co., Cincinnati, discoursed on "The Antics of the Man at the Fire" at the September meeting of the Cincinnati chapter of Steel Treathers on Sept. 16.

E. C. Smith, superintendent Central Alloy Steel Corporation, Massillon, Ohio, was the speaker at the Indianapolis chapter of the American Society for Steel Treating which opened its 1927-1928 season on Sept. 12. His address covered "Factors Governing the Choice of an Alloy Steel."

James A. Henry, who has been Detroit district manager of sales, Columbia Steel Co., Pittsburgh, for the past year, has become associated with the Weirton Steel Co. as assistant manager of sales. He will make his headquarters at the company's general offices in Weirton, W. Va., but he will continue to spend much time in the Detroit territory. Before going with the

Columbia company, Mr. Henry was for several years Detroit district sales manager Wheeling Steel Corporation.

W. A. Riddell, president Frederick Iron & Steel Co., Frederick, Md., and Frederick Engineering Co. has taken over the management of the Hadfield-Penfield Steel Co., Bucyrus, Ohio, and has renamed it the W. A. Riddell Co. The former receivership has been terminated and in the reorganization the company will retain the trade names of its various types of road machinery. Ownership of the company rests with Mr. Riddell and the National Surety Co. Other officers include M. O. Garner as vice-president and George M. Schmidt as secretary-treasurer. Plants in Mansfield, and Willoughby, Ohio, will be sold, as will a large building in Chicago, in consolidating the manufacturing operations at Bucyrus.

Ward B. Perley, who for the past eleven years has been vice-president and general manager of the Canadian Steel Corporation, Ltd., in charge of its properties at Ojibway, Ontario, has been elected president of the company to succeed Judge Elbert H. Gary. For five years before going to Ojibway, Mr. Perley had been assistant to President James A. Farrell of the United States Steel Corporation in New York. When he was placed in charge of the Canadian enterprise of the Steel Corporation it was expected that blast furnaces and steel works would be built at Ojibway, but for a number of years this project has been in abeyance. About two months ago it was announced that the equipment from the Hamilton, Ont., plant of the Canadian Steel & Wire Co., a subsidiary of the Steel Corporation, would be installed at Ojibway for drawing and galvanizing wire of various sizes. In the same connection it was stated that the installation of this plant would not mean the carrying out of the original plans for the completion or operation of blast furnaces and steel works. Mr. Perley has had wide experience in iron and steel works operation. In the eighteen-eighties he was connected with the Franklin Iron Works Co., operating a blast furnace at Columbus, Ohio, and later he was in charge of various operations for King, Gilbert & Warner. In 1899, when the National Steel Co. acquired the King, Gilbert & Warner Co., Mr. Perley went to Chicago as assistant to Riley Gilbert, vice-president in charge of the operating department. In 1901 he became connected with the New York offices of the Steel Corporation.

D. A. Polhemus has been made direct factory representative of the Lo-Hed hoist division, American Engineering Co., Philadelphia, in charge of its Pittsburgh office with territory including western Pennsylvania, West Virginia and the eastern border counties of Ohio. He will be assisted by John Kaiser, and offices will be located in the Oliver Building. W. C. Minier will direct the company's sales in northern Ohio, except for the territory around Toledo, and will maintain headquarters at 2195 Bellfield Avenue, Cleveland.

J. C. Rowett has been appointed district factory representative in Minnesota and northwestern Wisconsin for the Foote Brothers Gear & Machine Co., Chicago, and will have headquarters at 406 Sixth Avenue, South Minneapolis.

H. Douglas Stier, formerly sales manager Railway & Industrial Engineering Co., Greensburg, Pa., and more recently western sales manager of the American Brown Boveri Electric Corporation, New York, is now associated with the Walter Bates Steel Corporation, Gary, Ind., maker of steel floor grating, steel frame houses, poles, towers and other steel products.

J. W. Bunting, president of the Bunting Brass & Bronze Co., Toledo, sailed for England on Sept. 17. He will make his headquarters there for several weeks and begin an extended investigation of European markets with reference to the products of his company.

Daniel M. Johnson has been appointed European colonization manager of the Canadian National Railways, succeeding G. M. Dix, who resigned recently.

A. K. Lewis, recently assistant to the vice-president and general manager of the American Rolling Mill Co., Middletown, Ohio, has been elected vice-president in charge of operations of the Columbia Steel Co., Butler, Pa., recently acquired by the American Rolling Mill Co.

G. Adolphson was elected president of the Great Lakes Pressed Steel Corporation, 1400 Niagara Street, Buffalo, at a recent special meeting of the board. H. Adolphson was named vice-president and J. J. Wallace, secretary. Ward B. Johnson was made a director of the company.

William S. Guitteau has been appointed eastern district manager of the P. H. & F. M. Roots Co., Connersville, Ind., succeeding H. M. Papworth, who has retired from active business. Albert E. Loud, who has been connected with the company's New York office for a number of years, has been appointed assistant eastern district sales manager. The Chicago office of the Roots company has been placed in charge of Bowen T. Ehrnman, formerly connected with the West Gas Improvement Co.

William B. Todd, manager of sales, cold rolled department, Jones & Laughlin Steel Corporation, Pittsburgh, sailed this week on a European tour.

R. T. Beglinger, who has been attached to the Pittsburgh district sales office of the Allis-Chalmers Mfg. Co. for the past three years, has resigned to become associated with the Brazilian Trading Co., Sao Paulo, Brazil. He is a graduate of the University of Wisconsin, class of 1922. Before going to Pittsburgh he was in the company's works and general offices in Milwaukee.

J. M. Hipple has been appointed works manager of the East Pittsburgh works of the Westinghouse Electric & Mfg. Co., succeeding R. L. Wilson, recently promoted to assistant to vice-president and general manager. Mr. Hipple has been with the company since his graduation from Ohio State University in 1898. Since 1911 he has been manager of the motor engineering department, in which capacity he had charge of the designing for industrial apparatus.

OBITUARY

ROBERT DUNLAP, former superintendent Household Sewing Machine Co., Providence, R. I., died at his home in that city on Sept. 15. He was born in Johnston, R. I., Dec. 12, 1845. Mr. Dunlap learned the machinist trade at the Brown & Sharpe Mfg. Co. plant, and then went with the Providence Tool Co., which eventually became the Household Sewing Machine Co.

ERNEST W. TAYLOR, assistant treasurer Starrett Tool Co., Athol, Mass., died on Sept. 14 at the age of 48 years. He had been connected with the company since he was a young man.

EUGENE G. MCALEENAN, one of the founders of McAleenan Brothers Co. and the McAleenan Corporation, Pittsburgh, boiler and plate fabricating organizations, died at his home in that city on Sept. 10. He was born in Peoria, Ill., 61 years ago, going to Pittsburgh in 1899 to engage in the boiler-making business with his brother, George R. McAleenan.

HORACE A. BEALE, JR., who died at his home in Parkersburg, Pa., on Sept. 6 at the age of 57, was president of the Parkersburg Iron Co., Parkersburg. The obituary notice in THE IRON AGE of Sept. 15 erroneously connected Mr. Beale with the Parkersburg Iron Co.

FRANK CLINTON WIGHT, editor since January, 1924, of the *Engineering News-Record*, died Sept. 18 at his home in Summit, N. J. He was born in Washington, Feb. 26, 1882. He was graduated from Cornell University in 1904 and had been with *Engineering News* and its successor, the *Engineering News-Record*, since 1906. He was president of the National Conference of Business Paper Editors, a member of the American Society of Civil Engineers and other engineering bodies and the Engineers Club of New York, also a director of the American Construction Council. As an authority on reinforced concrete, he had contributed largely to the advancement of the art. In his passing technical journalism has lost one of its most talented leaders.

ANDREW GORDON FORBES, organizer of the Forbes Boiler Works, Peoria, Ill., and a leading industrialist of that section, died Sept. 14 at his home in Peoria, after three months of failing health. He was born in Scotland on June 10, 1842, the family coming to this country when Andrew was a lad. He served in the Civil War with the Sixty-seventh Volunteer Infantry. In 1871 he became foreman of the boiler department of the old P. P. & J. Railroad. In the late '80's, with his brother William, he organized the boiler works. He retired from active business 15 years ago.

E. G. MCALEENAN, of the McAleenan Brothers Co., Twenty-fifth and Railroad Streets, Pittsburgh, steam boiler maker, died at his home in that city on Sept. 10, aged 61 years. He was born at Peoria, Ill., and came to Pittsburgh in 1899. He helped to organize the McAleenan Brothers Co. in 1915 and the McAleenan Corporation, of which he was also an officer, in 1921.

ALBERT A. CARY, consulting mechanical engineer, 95 Liberty Street, New York, died Aug. 31 in New York at the age of 66 years. He was born in Worcester, Mass., and was a graduate of Worcester Polytechnic Institute. He was employed successively by Blake & Johnson, Waterbury, Conn.; Metropolitan Iron Works, New York; Cary & Moen, New York, becoming general manager; Wheeler & Wilson Mfg. Co., Bridgeport; and Abendroth & Root Mfg. Co., New York. He opened his consulting office in 1909, specializing in power plant work.

CLARENCE H. HOSLER, auditor at the Joliet Works, Illinois Steel Co., died Sept. 3, aged 70. He entered the steel business 36 years ago and since that time had been associated with several of the United States Steel Corporation subsidiaries.

WILLIAM J. MCALEEN, manager of the order department Illinois Steel Warehouse Co., Chicago plant, died Sept. 18 after an illness of several weeks. Burial will take place at Fannettsburg, Pa.

Iron and Steel Rates to Kansas Points Declared Prejudicial

WASHINGTON, Sept. 20.—Passing upon a complaint by the Wyeth Hardware & Mfg. Co., and others located at Atchison, Kan., and St. Joseph, Mo., Examiner Bronson Jewell in a tentative report to the Interstate Commerce Commission last week held that rates on iron and steel articles in carloads from points in Wisconsin, Illinois, Indiana, Iowa and Missouri and from east bank Mississippi River crossings on traffic originating east of the Indiana-Illinois State line to Atchison and St. Joseph are not unreasonable, but are unduly preferential to destinations in Missouri, Iowa and Minnesota which are accorded commodity rates less than fifth class from certain points of origin. Fifth class rates are paid by Atchison and St. Joseph. The examiner recommended removal of the prejudice and preference by ordering the rates to Atchison and St. Joseph reduced to a basis not higher than 5c. less than the applicable fifth class rates or by increasing the rates to the preferred points to fifth class.

JAPAN BUYS MORE TIN PLATE

Nippon Oil and Army Tin Plate Go To America —Railroads More Active

NEW YORK, Sept. 20.—Export to Japan has been slightly more active recently, but purchasing is still confined to the large consumers. The 61,000 base boxes of oil can tin plate for the Nippon Oil Co. has been divided between the two largest Japanese exporters in New York and placed with American mills. The 14,500 base boxes of tin plate for the Japanese army was also placed with a Japanese export house in New York and will be supplied by a large independent mill.

Japanese railroads are beginning to show more activity. The Imperial Government Railways will open bids Sept. 19 on 481 tons of I-beams for bridges. The Nara Railway, privately owned, has opened bids on about 27 miles of 75-lb. rails. Award is not yet reported, but it is believed by exporters who bid on this contract that it may go to the Yawata Seitetsu Jo, the Government steel works.

American Steel Importers Quiet

Importers of European steel in New York report but little current buying, with about the only sales at present in small lots of structural material. Sellers of German steel are still awaiting a decision on alleged violation by them of the anti-dumping act and are consequently not inclined to seek much business. Prices of Continental material are unchanged, but although they represent considerable savings to American consumers along the coast, purchasing is small.

Despite the prospect of action by the Treasury Department against German steel, one large company in Germany, already represented here, is preparing to establish its New York office as a branch to handle all export business with North America. This would bring Mexican and Canadian trade of the company under supervision of the New York branch.

French and Belgian mills are continuing to make additions to the list of American sections which they roll, according to the Thompson Purchasing Co., Paris. Rollings are in inch measurements and, by placing orders with several different mills, the purchaser can secure almost every size required. Thomas or Bessemer steel of commercial quality is furnished.

German Machinery Makers Report Good Business

HAMBURG, GERMANY, Sept. 4.—July exports of machinery were the highest since 1914 and imports were also higher than in any year since the war. During August conditions in the machinery industry showed further improvement. Only 8 per cent of the manufacturers reported unsatisfactory business, 61 per cent reported satisfactory business and 31 per cent good business. Demand for metal-working, wood-working, textile, power and building machinery is particularly good, but makers of mining machinery are inactive. Deliveries of machinery builders range from 13 to 14 weeks, although a few of the plants have greatly increased their capacity.

Wire Rod and Wire Netting Syndicates Will Expire

HAMBURG, GERMANY, Sept. 4.—The International Wire Netting Cartel, which includes as members British, French, Belgian and German manufacturers, expires Sept. 30 and will not be renewed. German makers of wire netting have refused to continue membership in the cartel unless Austrian and Czechoslovakian mills are brought in and these have refused to join.

The International Wire Rod Association, which includes French, German, Belgian and Luxemburg mills, probably will not be renewed. Contrary to official orders by the syndicate, the largest Belgian producer, La Providence Marchienne sur Pont, is still selling wire rods at £5 1s. to £5 2s. 6d. per ton (\$24.60 to \$25), even in small tonnages, while the official price of the

syndicate for small lots is £5 10s. to £5 12s. 6d. per ton. Meanwhile Columeta, a large Luxemburg export organization, is selling rods, apparently from the Acieries Reunies de Burbach-Eich-Dudelange, at 1s. per ton less than the official price. Other members have also entered into price shading and but little interest is shown in signing a new agreement.

German Pig Iron Price War Grows Worse

HAMBURG, GERMANY, Sept. 4.—The pig iron market, both domestic and export, is faced with further decline as a result of the internal competition with the Bavarian producer Maximilianshuette and external competition with British producers. The Maximilianshuette at Unterwellenbron, Bavaria, has entered into an agreement with the Rochlingen works in the Saar for large deliveries of pig iron to Germany, to be sold at less than the official prices established by the pig iron syndicate. In addition, the Maximilianshuette is completing another large blast furnace, which will soon go into blast on foundry iron. This situation coupled with the competition from British furnaces has already brought the price of pig iron down by about 8 m. (\$1.90) per ton. It is perhaps noteworthy that nine blast furnaces are under contract with builders, all of large capacity and of the latest type of construction. These will replace old furnaces.

Swedish Roads Buy Swedish Made Rails

WASHINGTON, Sept. 19.—For the first time since the war the Swedish State Railways have purchased 1000 tons of rails and rail plates from a Swedish mill, the Stora Kopparberg A. B., according to a report from Sweden to the Department of Commerce. Nine of the 10 bids received were from foreign mills, German, Belgian and French.

The bid of the Stora Kopparberg A. B. was 146.50 kr. (\$39.37) per ton for the rails and 187.50 kr. (\$50.38) per ton for the rail plates, a total of 153,000 kr. (\$41,118.75) for the contract. The lowest bid submitted was from the Comptoir Siderurgique de France, 125 kr. (\$33.06) per ton for the rails and 158.70 kr. (\$42.65) per ton for the rail plates.

In this particular case the domestic maker was favored because it is hoped that the recipient will be assisted in increasing its competitive ability and eventually establish an efficient and competitive steel rail industry in Sweden. It is pointed out that the Stora Kopparberg A. B. is willing to make every effort to bring this about and a considerable sacrifice was made even in quoting the high prices in the present instance. The ability of the Swedish maker to offer earlier deliveries than the foreign mills is understood to have had some weight.

It is said that the award of future business by the Swedish State Railways will be governed to a great extent by the price policy of the European Rail Makers Association, but the railroad authorities have stated that they are desirous of aiding the domestic industry and will make every reasonable effort to continue placing orders in Sweden.

Krupp Sells Diesel Locomotive to American Railroad

HAMBURG, GERMANY, Sept. 4.—An order for a Diesel engine driven locomotive has been secured from the Boston & Maine Railroad in the United States by Friedrich Krupp A. G. This engine has been tested in Germany and it is claimed by the makers that it will operate about 60 per cent longer without replenishment of fuel than previous Diesel driven locomotives. In addition operating costs are said to be considerably lower than on a steam-driven engine. Diesel driven locomotives are being introduced on the German railroads. If the present engine, sold to the Boston & Maine Railroad, proves satisfactory, further orders are expected.

Recently the Krupp works received a contract for about \$1,000,000 from Russia for the erection of a large cement plant.

Oil, Gas and Electric-Fired Furnaces

(Continued from page 790)

out type originally. General practice today is a continuous type of pair furnace, where the sheet bars, raised on skid rails, are pushed from the cold end to the discharge end of the furnace. The sheet furnace is built adjacent to the pair furnace, with the sheets charged and discharged through the same door. The furnaces are mostly fired with stokers using coal.

Smoky Furnace a Welsh Hobby

The sheet steel industry has been greatly influenced by traditions brought from Wales, where the industry had its early development. The old Welsh rollers who came to this country, and who today represent a tremendous influence, were firmly convinced that, without a heavy smoky condition in the furnace, the sheets could not be rolled satisfactorily. Even when natural gas was available in the steel mill district, at 10c. per 1000 cu. ft., few furnaces used it, because the heaters had difficulty in producing the particular color atmosphere and the amount of smoke which they felt necessary. A gradual change has been taking place in this situation.

Some years ago the first high-pressure automatic proportioning sheet and pair furnaces were put into operation on gas. Everybody claimed it impossible to make a satisfactory sheet in an atmosphere perfectly clear and in a furnace which, to the eye, was simply a beautiful incandescent mass of heat. How successful this has been is indicated by the fact that one of the most modern and latest plants put up by a steel corporation in the South is using by-product coke oven gas for sheet and pair heating operations.

Continuous Sheet Mill

The sheet steel industry is in a state of transition which represents the most violent disturbance to standard practice that it has ever experienced. I refer to the introduction of the continuous mill. Several years ago one company, with great courage, began the development of a process which would take the steel straight through the mill from the ingot to the finished sheet, in a continuous process. The investment of several years plus a great amount of money has resulted in carrying the process to a point where it is generally understood to be successful.

Other mills, anticipating this situation where the continuous mill could produce sheets at a cost not over half the ordinary cost of producing sheets, have been working along similar lines. In the past year installations of continuous wide-strip mills have been made. This type of mill will undoubtedly eliminate the old fashioned sheet and pair furnace operation, unless the new continuous mill fails to produce satisfactory sheets.

It is without question a matter of time only until all mills producing sheets have adopted some kind of a continuous process. This perhaps will be a compromise between present methods and the continuous type, where the partly finished sheets will be placed on roller tables, carried through the heating zone and discharged at the correct temperature to the mill rolls. Such a furnace of necessity will have to be fired with gas. Hot producer gas will be used where no other gas is available. The preference will always be a cold, clean gas.

Annealing Practice Likely to Change

Old-fashioned box annealing, which represents several days delay, is certain to be replaced in the near future with open continuous annealing, where a few minutes of treatment will replace the 24-hr. cycle previously used.

Annealing operations for certain grades of wire

have been carried on in pot types of furnaces usually coal fired. This compares closely with the box type annealing formerly in vogue for sheets. The trend today is distinctly toward open annealing and experimental work has been carried on to the point where a bundle of wire in a 5-min. treatment in an open furnace of the continuous type can be made to show the same grain structure and the same physical qualities obtained in the pot anneal using an 18 or 24-hr. cycle. The trend therefore will be to continuous open annealing operation for wire. Gas will undoubtedly be used for fuel, because of the necessity for controlling the atmospheric conditions.

Wire Industry Experiments

A splendid example of the value of a furnace where the atmosphere can be controlled is the open patenting furnace, which is being generally installed throughout the wire industry. This furnace on gas, using automatic proportioning burner equipment, has been found to reduce the scale loss in spring wire a sufficient amount to pay for the cost of gas, when gas was selling for 70c. Many installations of this type of furnace have been made in the past three years, with uniformly satisfactory results.

An electric furnace for this operation was installed some three years ago in Newark. It was found that the conditions required for control of atmosphere could not be satisfactorily met in it. Hence it was displaced by city gas.*

A recent modification of the straight gas-fired open patenting furnace has been successfully worked out, using oil as the main heating fuel and gas as an auxiliary fuel to control the atmosphere definitely and to act as a governor to maintain constant temperature conditions for fluctuating load. This combination represents a solution where gas is extremely expensive, but does not indicate a definite trend of development.

Tinning and Galvanizing

For lead annealing, thinning and galvanizing operations all fuels have been used. But it has been established that pot life and temperature control can be secured with the electric and gas-fired furnace much better than with oil. Temperature control can be secured better with a gas furnace than with an electric furnace. This was proved with certain tests on tinning operations in a large steel mill near Baltimore last year. Pot life in the electric furnace is ordinarily longer than in the gas furnace. The choice between the fuels represents the cost for fuel and the cost for pots and delays in changing of pots, translated into the cost per unit of finished product, to determine which fuel will give the ultimate lower cost.

It is interesting to note that a new galvanizing process developed in England shows a fuel consumption, using gas, of half that of present installations. It has not been installed in this country, but within the next few months we should have operating results on it. If they prove as successful here as in England, it undoubtedly will permit the choice of gas for this operation over all other fuels.

Manufacture of tin plate involves heating operations similar to steel sheets, except for the annealing and the tinning operation. Up to the present the most satisfactory annealing process has been the continuous tunnel kiln of the indirect fired type. It does not appear that this process will be displaced in the near future. For this type of kiln either coal, gas or oil make equally satisfactory fuels, and their choice depends entirely upon local conditions.

*See THE IRON AGE, July 30, 1925, page 275.

In general heat treatment, which involves annealing operations, carbonizing, hardening and drawing operations, more progress has been made in automatic continuous equipment than anywhere else. It has been fairly well established that, from the standpoint of control, gas and electricity will do equally satisfactory work for all of these operations, that the design of equipment can be made equally continuous and automatic, that the maintenance is comparable and therefore that the choice between fuels becomes a matter of selection based upon relative fuel costs for the particular installation.

Heat Treatment in General

Development of electric furnaces for this class of work has been more advanced and their acceptance more general than in any other field of low-temperature operations. The automotive industry in particular has looked with favor upon the electric heat treating unit because of its control features.

The past two years have witnessed a decided trend to gas-fired furnaces for these operations. Various questions which first required answering, such as the ability of gas to harden parts satisfactorily, its influence on surface, its susceptibility to control and its efficiency, had to be proved in practical installations. These have all been demonstrated, with the result that in three years the increase in the use of gas has been at the rate of 1500 per cent in the automotive industry, for automatic heat treating equipment.

Rolls, Rolling and Roll Turning

Two quotations below are taken from a copy of *Wabblar*, a monthly publication recently started by MacKintosh-Hemphill Co., Pittsburgh. It is a little four-page sheet which hopes to present in an open forum discussion along the line of roll designing and rolling practice.

THE ROLL TURNER—A TRIBUTE

"Nowhere in the field of industry have man's developments been more pronounced than when he conquered the forces brought into play in the rolling of steel in all of its varied forms. His success in this field is so significant that one often wonders how the human element is capable of directing the equipment and machinery which exert the power required to reduce ingots to final finished product. Make no mistake, he is on the job, and unprecedented records of performance continue to pile up year after year as evidence.

"Are our minds so occupied in this vast industry that we overlook the human operating element, because of the fact that so few individuals are in evidence? Do we ever permit our minds to cover all of the details of the picture we have seen presented, as ton after ton of steel whirls by? Do we carefully trace continuity of the rolling process in its various steps?

"The men responsible for the design and strength of equipment to withstand the forces exerted are essential, but do we visualize as we should to appreciate fully what is happening? The man responsible for the design of the rolls is surely a most important factor.

"Whatever the theory of roll designing, as applied to rolling practice today, the foundation of it all has been based upon repeated trial, repeated failure, repeated success, and it is through the knowledge of the roll turner (the designer) that much of what we see today is possible. Engineers may determine the forces to be exerted to produce the results, but the roll turner stands out as a prominent figure in the picture, and he, above all the rest, has proved to be the master of what 'Dame Experience' has taught him."

THE ROLL—AN EVOLUTION

"Many important developments in industry have faded into obscurity for lack of proper recording. Nevertheless some of the simple yet great contribu-

In the non-ferrous metal industry, bright anneal furnaces have been produced using water seals and muffles, where the work is annealed in an atmosphere of steam. They have been only fairly successful, as they represent a complicated construction and operating condition. Neither gas, electricity nor oil, alone, will produce a strictly bright surface for open annealing of copper and brass. The question then resolves itself into development of the most satisfactory furnace construction and the use of a fuel which has the correct form value for best results. The trend in this field is not yet definitely indicated.

Conclusions

Looking at the entire picture, it is impossible to escape the conclusion that manufacturers have made the most progress in those industries where the furnace builders have been given an opportunity to produce equipment to meet the manufacturers' requirements under conditions of good cooperation. It is therefore obvious that industry must place more dependence upon the furnace manufacturer to solve problems of production which relate to heat applications. The great developments in the furnace industry in the future will come from those examples of splendid cooperation between the mill and the furnace manufacturer, whereby processes plus combustion developments will be united to produce the most economical heat operations possible.

tions stand out by illuminating the path of progress. For example, it is known that 'the wheel as a burden-bearing device appeared for the first time on wheeled carts and chariots drawn by donkeys about 3000 B. C., among the Sumerians.'

"Although meteoric iron was forged into implements probably as early as 4000 B. C., it is interesting to note that the roll, an evolution of the wheel, was not introduced into the manufacture of iron for more than 4500 years after the wheel was first used. In 1550 a Frenchman named Brulier 'first rolled sheets of metal to a uniform thickness for the purpose of making coins of equal weight.' He was headed for the requirement—'of equal weight and fineness.'

"So we see that, in less than four centuries, the rolling industry has grown until today it is the center about which our entire industrial system revolves. Scarcely a necessity or a luxury can be mentioned in the manufacture of which rolled products have not been an important factor. Rolled products have made possible our homes, our factories, our offices, our means of transportation and communication. In general, our present economic structure is practically based upon the simple, ancient expedient, as it appears today, of revolving a body to decrease the work of transporting a burden.

"The constant effort to accommodate new sections, to simplify usages, to obtain higher efficiency and greater production, depends largely upon roll performance. The roll maker has maintained the initiative, and in spite of the fact that rolling conditions are becoming more severe, roll performances have kept pace with demands which, only a few years ago, would have been considered impossible."

Locomotives were made in 1925 in 18 establishments. The average number of wage earners during the year was 12,809 and the wages amounted to \$18,218,843, both these figures being the lowest for any year since 1914.

Mechanical stokers to the number of 160 with a 60,977-hp. rating were sold in August, according to reports received by the Department of Commerce from 12 producing establishments. This compares with 136 with 41,504-hp. sold in July.

British Claim Rebates Are Successful

Continent Doubts Their Efficacy — Germany Prepares To Seek Export Trade as Home Market Declines — French Market Fails To Revive

(By Cable)

LONDON, ENGLAND, Sept. 19.

DEMAND for Cleveland pig iron is increasing, both domestic and foreign users purchasing good quantities. Additional blast furnaces are ready but not yet blown in.

The hematite market is better and makers' stocks have been reduced appreciably so that prices are stiffening. Foreign ore is still quiet.

There is an improved tone in the ferromanganese market on the report that negotiations have been instituted among leading world producers to arrive at an arrangement to avoid undue price cutting. Negotiations are only in the initial stage, so that details are not available.

The steel makers' association has made no alteration

in domestic and export prices and officially announces that the rebate plan is operating satisfactorily. The market is still quiet generally, but inquiry is more promising and fair export sales are anticipated following the announcement that there will be no alteration of quotations.

Tin plate is quiet with a decline of prices to 18s. per base box (\$4.37) f.o.b. works port. The pooling arrangement by makers is to be continued but payments to the pool will be reduced.

Galvanized sheets are inactive. Black sheet sales are small, but inquiry is improving.

Continental iron and steel markets are very quiet. There is but little buying either by domestic or export users and works are in need of orders but unwilling to make further concessions.

FRENCH MARKET UNIMPROVED

Orders For Fall Disappointing — Election Next Year a Factor

PARIS, FRANCE, Sept. 9.—The expected increase in business after the summer vacation period has not yet developed. Domestic market prices are being maintained with difficulty and the improvement in export business that began in August has not continued. To depress business conditions further elections to the legislature will stir political activity in 1928. Cost of living continues high and unemployment has increased as a result of the closing of some plants and part time operation by others. The slackening in business activity is reflected in the reduction of 14 per cent in the receipts of the railroads. With British and German producers active in competition for export trade, it is increasingly difficult to secure foreign business and inquiries from abroad are decreasing, particularly from Japan.

Pig Iron.—Domestic demand is smaller than last month and some producers are inclined to curtail output, but as such action would result in higher pro-

duction costs nothing has been done as yet. The phosphoric pig iron producers are scheduled to meet Sept. 15, but it is doubted that the prices for October will be decided at that time. It is said in some quarters that the object of the meeting is to discuss export quotas. Hematite iron shows no improvement and prices cannot be maintained as producers are endeavoring to meet the competition of foreign competitors. As a result of the price reduction by British producers and the additional rebates and bounties, the French, Belgian and Luxemburg furnaces have suffered loss of trade. On the whole, prices seem to be based on the offerings of British and German sellers of pig iron.

Semi-Finished Material.—Export demand is only moderate and prices are unstable. Blooms are quoted at £3 18s. 6d. to £4 3s. (\$19.06 to \$20.17) per ton and billets at £4 5s. to £4 6s. 6d. (\$20.66 to \$21.02) per ton, f.o.b. Antwerp. Sheet bars are unchanged and slightly firmer than billets or blooms at £4 7s. to £4 8s. (\$21.14 to \$21.38) per ton, f.o.b. Antwerp.

Finished Material.—Prices are lacking in stability and buyers are unwilling to enter into contracts. Deams are showing a slight tendency to weakness as demand from the building trades has declined. In some quarters this is explained by the claim that reinforced

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.	£0 18s.		\$4.37	
Bilbao Rubio ore f.	1 1	to £1 1¼s.	5.10	to \$5.16
Cleveland No. 1 fdy.	3 10		17.01*	
Cleveland No. 3 fdy.	3 7½		16.40*	
Cleveland No. 4 fdy.	3 6½		16.16*	
Cleveland No. 4 forge	3 6		16.04*	
Cleveland basic (nom.)	3 15	to 3 15½	18.23	to 18.35
East Coast mixed.	3 15		18.23	
East Coast hematite	3 15½		18.35	
Rails, 60 lb. and up	7 15	to 8 0	37.67	to 38.88
Billets	6 0	to 6 10	29.16	to 31.59
Ferromanganese	12 0		58.32	
Ferromanganese (export)	10 15	to 11 0	52.25	to 53.46
Sheet and tin plate bars, Welsh	5 11½	to 5 15	27.09	to 27.95
Tin plate, base box.	0 18	to 0 18¼	4.37	to 4.43
Black sheets, Japanese specifications.	13 15	to 14 0	66.83	to 68.04
C. per Lb.				
Ship plates	7 12½	to 8 2½	1.65	to 1.76
Boiler plates	10 10	to 11 0	2.28	to 2.39
Tees	8 2½	to 8 12½	1.76	to 1.87
Channels	7 7½	to 7 17½	1.60	to 1.70
Beams	7 2½	to 7 12½	1.55	to 1.65
Round bars, ¾ to 3 in.	7 12½	to 8 2½	1.65	to 1.76
Steel hoops	10 10	to 11 0	2.28	to 2.39
Black sheets, 24 gage	10 0	to 10 5	2.17	to 2.22
Galv. sheets, 24 gage	13 15	to 14 0	2.98	to 3.03
Cold rolled steel strip, 20 gage, nom.	14 0	to 14 5	3.03	to 3.09

*Export price, 2½s. less for 500 tons or more.
†Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports (Per Metric Ton)

Foundry pig iron: (a)				
Belgium	£3 0s.	to £3 0½s.	\$14.58	to \$14.70
France	3 0	to 3 0½	14.58	to 14.70
Luxemburg	3 0	to 3 0½	14.58	to 14.70
Basic pig iron:				
Belgium	2 18	to 2 19	14.09	to 14.34
France	2 18	to 2 19	14.09	to 14.34
Luxemburg	2 18	to 2 19	14.09	to 14.34
Coke	0 18		4.37	
Billets:				
Belgium	4 5	to 4 6	20.66	to 20.90
France	4 5	to 4 6	20.66	to 20.90
Merchant bars:				
C. per Lb.				
Belgium	4 13	to 4 14	1.03	to 1.04
France	4 13	to 4 14	1.03	to 1.04
Luxemburg	4 13	to 4 14	1.03	to 1.04
Joists (beams):				
Belgium	4 12	to 4 13	1.02	to 1.03
France	4 12	to 4 13	1.02	to 1.03
Luxemburg	4 12	to 4 13	1.02	to 1.03
Angles:				
Belgium	4 13	to 4 14	1.03	to 1.04
¼-in. plates:				
Belgium (a)	6 5	to 6 6	1.38	to 1.39
Germany (a)	6 5	to 6 6	1.38	to 1.39
¾-in. ship plates:				
Belgium	6 1	to 6 2	1.33	to 1.34
Luxemburg	6 1	to 6 2	1.33	to 1.34
Sheets, heavy:				
Belgium	6 1		1.33	
Germany	6 1		1.33	

(a) Nominal.

concrete is coming into more general use than structural steel. For export, beams are quoted at £4 10s. to as high as £4 12s. 6d. per ton (0.99c. to 1.02c. per lb.) depending upon the specification. Reinforcing bars range from £4 12s. to £4 12s. 6d. per ton (1.01c. to 1.02c. per lb.), f.o.b. Antwerp. Sheets are fairly firm in the export market and with two of the important producers of thin gage sheets temporarily out of the market, the lighter gages are showing considerable strength.

GERMAN ACTIVITY DECLINES

Period of Depression Expected—Dissatisfaction With Syndicates—To Pay Cartel Fine

BERLIN, GERMANY, Sept. 7.—It seems to be generally expected that the era of intense activity enjoyed by the iron and steel industry will soon be followed by a period of increasing depression. Business continues good, however, and the number of unemployed is 576,000, a little more than 25 per cent of the unemployment in February. Stocks in the hands of industrial consumers are large, however, and continuation of domestic purchasing at the present rate could not continue indefinitely. A certain result of this expected depression is the renewal of German competition for foreign business and a decline of imports, which have lately been large.

New business in the iron and steel industry is smaller, but works are still well booked with contracts that should carry them into the early winter, although delivery terms are becoming shorter. A severe struggle for markets and continued unprofitable prices are predicted as a result of the decline in German domestic activity.

The rebates being paid by British producers of steel to domestic consumers who confine their purchases to the home market are not expected to have any immediate effect on German trade, which has represented only a small part of recent British imports. It seems to be rather generally doubted that this measure will materially reduce imports of foreign material by British consumers, the rebates being small compared with the difference in prices between British and Continental quotations. In some cases it is pointed to as proof that the British mills should join the International Steel Cartel. Most of the imports come from France and Belgium and the ability of French mills to sell cheaply is claimed to be largely because of the premium for underproduction paid by the International Steel Cartel.

Unofficial estimates of the cartel's operations in the second quarter of this year show that Germany exceeded her quota by 833,000 metric tons and must pay about \$1,660,000 in penalties. The Belgian quota has been exceeded by 75,750 tons involving a fine in proportion. French mills, however, have produced about 10 per cent less than the French quota, about 1,992,000 metric tons out of a total allotment of 2,283,000 tons. As the premium for underproduction is paid only on this 10 per cent, French mills will receive \$228,300 from the cartel fund, compared with \$148,717 in the first quarter and \$86,400 in the preceding quarter.

The International Steel Cartel is still being criticized in Germany as ineffective, but the recent conclusion of a Franco-German commercial treaty removes the risk that Germany might renounce the cartel agreement. In the trade press there is comment on the reported growth of disillusionment in Germany as to the value of large corporations, syndicates and international cartels. The benefits gained from these combinations have been less than had been expected and in several instances they have appeared as disadvantages.

The German Pig Iron Syndicate is not looked upon with satisfaction and the International Wire Syndicate, to which Germany, Czechoslovakia and other western producing countries belong, is declared by many to have facilitated American exports to South America, Cuba and other overseas markets. The French, Belgian, Luxemburg pig iron entente is no longer in control of prices, so that German membership is out of the question for the present. The German Screw Syndicate is threatened by withdrawal of a leading producer

in the Rhineland. There is also a dispute in the Scrap Buying Syndicate.

The scrap market is weak and pig iron is quiet. At the beginning of September producers of semi-finished material, bars, and shapes had orders to carry them for the next 90 days and mills rolling heavy gage sheets were occupied for two to three months. The export market has improved slightly, but there is still only moderate interest in export selling. Works manufacturing railroad permanent way material are well booked with business and there are some large foreign contracts for rails under negotiation. Mine rails, however, are quiet. The domestic bar market is dull but export prices are slightly higher than a month ago.

Credit difficulties are beginning to hamper business. Iron and steel producers complain of slower payments and of requests for longer credits. The domestic market for pipe is slightly better but export is still quiet. The tube syndicate declares that American competition in foreign markets is increasing. In the domestic field, however, progress has been made toward long-distance delivery of gas and rights have been obtained to lay pipe along the roads in the province of Westphalia. No such agreement has been made as yet with other provinces as the municipalities which conduct their own gas works fear financial losses.

The automotive industry is well occupied with business. The proportion of automobile sales on the installment system, which was adopted in Germany less than two years ago, is rapidly increasing. Standardization and mergers in the automotive industry have resulted in a great reduction in the number of car types and producers.

BELGIAN MARKET STEADY

Prices Fairly Firm—British Undersell on Pig Iron

ANTWERP, BELGIUM, Aug. 29.—Demand is still small and even quieter than in previous weeks, but prices are slightly firmer and sellers are looking forward to a revival of buying early in September. Bars and sheets are among the products showing decided strength despite lack of sizable purchasing, but this may be because of the fact that a number of the larger mills are well booked with orders and not in the market at present. A further advantage is the lack of competition from French and Luxemburg mills, which are showing less interest than usual in booking Belgian business.

Pig Iron.—The domestic market is quiet and export business is declining. As a result of the lowered prices of British producers, Continental quotations are no longer so interesting to consumers. Quotations on phosphoric foundry iron range from £3 to £3 5s. (\$14.58 to \$15.80) per ton, f.o.b. Antwerp. Belgian Bessemer hematite is quoted at 700 fr. f.o.b. for large tonnages but this price is too high to interest foreign buyers with the British quoting on a still lower level. The pig iron entente has continued its official prices unchanged for the domestic market.

Semi-Finished Material.—British consumers, who are the most important customers of Belgian mills, are offering better prices than recently, but they are still lower than mills are willing to accept. In consequence, current business is confined to the covering of immediate requirements. Prices at which transactions have taken place are £4 (\$19.44) per ton for blooms 6 in. and larger.

Finished Material.—Despite the lack of any demand for sizable tonnages, prices are quite firm. Bars have been quoted at £4 16s. per ton (1.06c. per lb.) and buyers have made offers of £4 7s. per ton (0.95c. per lb.). The price on actual business, however, seems to have been about £4 15s. per ton (1.05c. per lb.) with £4 14s. 6d. per ton (1.04c. per lb.) quoted on desirable specifications. Beams are quiet and prices are being maintained with difficulty. The wire rod market continues to show recovery and the higher prices being asked by makers about a fortnight ago, now represent the actual market. Hoop buyers are inactive and the market is inclined toward weakness. Deformed bars are stronger in sympathy with the higher bar market.

British Claim Rebates Are Successful

Continent Doubts Their Efficacy — Germany Prepares To Seek Export Trade as Home Market Declines — French Market Fails To Revive

(By Cable)

LONDON, ENGLAND, Sept. 19.

DEMAND for Cleveland pig iron is increasing, both domestic and foreign users purchasing good quantities. Additional blast furnaces are ready but not yet blown in.

The hematite market is better and makers' stocks have been reduced appreciably so that prices are stiffening. Foreign ore is still quiet.

There is an improved tone in the ferromanganese market on the report that negotiations have been instituted among leading world producers to arrive at an arrangement to avoid undue price cutting. Negotiations are only in the initial stage, so that details are not available.

The steel makers' association has made no alteration

in domestic and export prices and officially announces that the rebate plan is operating satisfactorily. The market is still quiet generally, but inquiry is more promising and fair export sales are anticipated following the announcement that there will be no alteration of quotations.

Tin plate is quiet with a decline of prices to 18s. per base box (\$4.37) f.o.b. works port. The pooling arrangement by makers is to be continued but payments to the pool will be reduced.

Galvanized sheets are inactive. Black sheet sales are small, but inquiry is improving.

Continental iron and steel markets are very quiet. There is but little buying either by domestic or export users and works are in need of orders but unwilling to make further concessions.

FRENCH MARKET UNIMPROVED

Orders For Fall Disappointing — Election Next Year a Factor

PARIS, FRANCE, Sept. 9.—The expected increase in business after the summer vacation period has not yet developed. Domestic market prices are being maintained with difficulty and the improvement in export business that began in August has not continued. To depress business conditions further elections to the legislature will stir political activity in 1928. Cost of living continues high and unemployment has increased as a result of the closing of some plants and part time operation by others. The slackening in business activity is reflected in the reduction of 14 per cent in the receipts of the railroads. With British and German producers active in competition for export trade, it is increasingly difficult to secure foreign business and inquiries from abroad are decreasing, particularly from Japan.

Pig Iron.—Domestic demand is smaller than last month and some producers are inclined to curtail output, but as such action would result in higher pro-

duction costs nothing has been done as yet. The phosphoric pig iron producers are scheduled to meet Sept. 15, but it is doubted that the prices for October will be decided at that time. It is said in some quarters that the object of the meeting is to discuss export quotas. Hematite iron shows no improvement and prices cannot be maintained as producers are endeavoring to meet the competition of foreign competitors. As a result of the price reduction by British producers and the additional rebates and bounties, the French, Belgian and Luxemburg furnaces have suffered loss of trade. On the whole, prices seem to be based on the offerings of British and German sellers of pig iron.

Semi-Finished Material.—Export demand is only moderate and prices are unstable. Blooms are quoted at £3 18s. 6d. to £4 3s. (\$19.06 to \$20.17) per ton and billets at £4 5s. to £4 6s. 6d. (\$20.66 to \$21.02) per ton, f.o.b. Antwerp. Sheet bars are unchanged and slightly firmer than billets or blooms at £4 7s. to £4 8s. (\$21.14 to \$21.38) per ton, f.o.b. Antwerp.

Finished Material.—Prices are lacking in stability and buyers are unwilling to enter into contracts. Beams are showing a slight tendency to weakness as demand from the building trades has declined. In some quarters this is explained by the claim that reinforced

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.86 per £ as follows:

Durham coke, del'd.	£0 18s.			\$4.37	
Bilbao Rubio ore†	1 1	to £1 1½s.		5.10	to \$5.16
Cleveland No. 1 fdy.	3 10			17.01*	
Cleveland No. 3 fdy.	3 7½			16.40*	
Cleveland No. 4 fdy.	3 6½			16.16*	
Cleveland No. 4 forge	3 6			16.04*	
Cleveland basic (nom.)	3 15	to 3 15½		18.23	to 18.35
East Coast mixed	3 15			18.23	
East Coast hematite	3 15½			18.35	
Rails, 60 lb. and up	7 15	to 8 0		37.67	to 38.88
Billets	6 0	to 6 10		29.16	to 31.59
Ferromanganese	12 0			58.32	
Ferromanganese (export)	10 15	to 11 0		52.25	to 53.46
Sheet and tin plate bars, Welsh	5 11½	to 5 15		27.09	to 27.95
Tin plate, base box	0 18	to 0 18¼		4.37	to 4.43
Black sheets, Japanese specifications	13 15	to 14 0		66.83	to 68.04
Ship plates	7 12½	to 8 2½		1.65	to 1.76
Boiler plates	10 10	to 11 0		2.28	to 2.39
Tees	8 2½	to 8 12½		1.76	to 1.87
Channels	7 7½	to 7 17½		1.60	to 1.70
Beams	7 2½	to 7 12½		1.55	to 1.65
Round bars, ¾ to 3 in.	7 12½	to 8 2½		1.65	to 1.76
Steel hoops	10 10	to 11 0		2.28	to 2.39
Black sheets, 24 gage	10 0	to 10 5		2.17	to 2.22
Galv. sheets, 24 gage	13 15	to 14 0		2.98	to 3.03
Cold rolled steel strip, 20 gage, nom.	11 0	to 14 5		3.03	to 3.09

*Export price, 2½s. less for 500 tons or more.
†Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports (Per Metric Ton)

Foundry pig iron (a)					
Belgium	£3 0s.	to £3 0½s.	\$14.58	to \$14.70	
France	3 0	to 3 0½	14.58	to 14.70	
Luxemburg	3 0	to 3 0½	14.58	to 14.70	
Basic pig iron:					
Belgium	2 18	to 2 19	14.09	to 14.34	
France	2 18	to 2 19	14.09	to 14.34	
Luxemburg	2 18	to 2 19	14.09	to 14.34	
Coke	0 18		4.37		
Billets:					
Belgium	4 5	to 4 6	20.66	to 20.90	
France	4 5	to 4 6	20.66	to 20.90	
Merchant bars:					
Belgium	4 13	to 4 14	1.03	to 1.04	
France	4 13	to 4 14	1.03	to 1.04	
Luxemburg	4 13	to 4 14	1.03	to 1.04	
Joists (beams):					
Belgium	4 12	to 4 13	1.02	to 1.03	
France	4 12	to 4 13	1.02	to 1.03	
Luxemburg	4 12	to 4 13	1.02	to 1.03	
Angles:					
Belgium	4 13	to 4 14	1.03	to 1.04	
¼-in. plates:					
Belgium (a)	6 5	to 6 6	1.38	to 1.39	
Germany (a)	6 5	to 6 6	1.38	to 1.39	
¾-in. ship plates:					
Belgium	6 1	to 6 2	1.33	to 1.34	
Luxemburg	6 1	to 6 2	1.33	to 1.34	
Sheets, heavy:					
Belgium	6 1		1.33		
Germany	6 1		1.33		

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Machinery Markets and News of the Works

INQUIRIES HEAVIER

Exposition Expected to Result in Closing of Much Pending Business

Machine Tool Sales at New York Show Gain Over Bookings in August

THE center of interest in the machine tool market is the National Machine Tool Exposition, which is being held in Cleveland this week. Considerable pending business is expected to be placed following an inspection of the exhibits. Meanwhile buying has shown a slight gain at New York, being at a higher rate than in August, and at Cleveland sales of turret lathes are heavier than last month.

New York

NEW YORK, Sept. 20.

THE moderate degree of improvement in machine tool business commented upon a week ago has extended into the past week, with slight gains. Inquiries are considerably more numerous, but orders also have been at a better rate than was general last month. One order booked by a New York dealer calls for about 10 machines costing with equipment about \$25,000. The machine tool sellers of this district, as well as buyers, are well represented at the National Machine Tool Exposition in Cleveland, which is the center of the machine tool market for the week.

Among recent sales in this market are the following: Niles No. 7½ rod boring machine to the Atchison, Topeka & Santa Fe Railroad; 96-in. 600-ton wheel press to the Southern Pacific; 48-in. 300-ton wheel press to a Chicago carwheel manufacturer; a tool room lathe to a Providence, R. I., tool manufacturer; a 4-spindle drilling machine to a Chicago manufacturer; a tool room lathe to a New York State manufacturer of electrical goods; a 14-in. vertical surface grinder to a New Britain, Conn., manufacturer; a jig borer to a Providence manufacturer of tools and gages; a jig borer to a company in Indiana.

Officials of the Union Bag & Paper Corporation, Woolworth Building, New York, have organized the Union Bag & Paper Power Co., a new subsidiary, to acquire and develop hydroelectric and steam electric power properties and sites on the Hudson River, near Hudson Falls, N. Y., where existing mills are located, for power service for present and future requirements; also, to acquire water front property at Tacoma, Wash., where the parent company purposes to construct a new paper mill. The latter project will be carried out in conjunction with the St. Paul & Tacoma Lumber Co., Tacoma, which will furnish pulpwood supply for the plant. A sawmill will be constructed, to be equipped for a capacity of 150,000 b. m. ft. per day. The paper mill unit will be devoted to kraft stocks. The entire project will cost more than \$2,000,000. C. M. McMillen is vice-president of the Union Bag company, and Everett G. Griggs, president of the St. Paul Lumber company. The Union Bag & Paper Power Co. is arranging for a bond issue of \$3,000,000 to carry out the plans.

The Peerless Floor Finishing Co., New York, has leased the ground floor in the building at 237 East Forty-first Street for a machine repair shop.

The Bullard-Murtha Motor Co., Inc., 902 Quentin Road, Brooklyn, has awarded a general contract to Peter Guthy, 852 Monroe Street, for a new three-story service, repair and sales building, to cost about \$150,000 with equipment. E. W. Kleinert, 250 Park Avenue, New York, is architect. John Murtha is head.

In most centers, however, the volume of purchases is relatively small, although there has been an encouraging increase in inquiries. At Chicago the agricultural implement industry is the only important consuming group that is actively buying equipment. Railroad purchases are limited mainly to single machines.

The Cleveland Board of Education is taking bids on five standard machines for a trade school.

A Cincinnati machine tool builder has sold 14 lathes to an automobile manufacturer, making a total of 39 recently ordered by that buyer. Another automobile maker has bought seven lathes. Equipment orders for new car repair shops of the Cincinnati Street Railway Co., now being placed, are expected to total \$100,000.

The Board of Education, Schenectady, N. Y., contemplates the installation of manual training equipment in a proposed new high school in the Mount Pleasant district, to cost \$250,000. R. L. Bowen, 207 State Street, is architect.

The Queens Borough Gas & Electric Co., Rockaway District, Queens, N. Y., has arranged for a bond issue of \$1,200,000, a portion of the fund to be used for extensions and improvements. The company also operates the Nassau & Suffolk Lighting Co.

D. H. Canfield, 11 Linden Place, Middletown, N. Y., architect, is completing revised plans for a three-story automobile service, repair and garage building, to cost close to \$100,000 with equipment.

The Board of Education, Park Avenue and Fifty-ninth Street, New York, plans the installation of manual training equipment in new high schools soon to be erected in connection with a program of school construction for 1927-28, including the Samuel Tilden High School; Seward Park High School; Far Rockaway High School, and the John Adams High School, each to cost more than \$1,000,000. William Gompert, Flatbush Avenue Extension and Concord Street, Brooklyn, is architect for the board.

The Bigelow Electric Mfg. Co., Brooklyn, has leased space in the Bush Terminal, South Brooklyn, for expansion.

The Brooklyn Edison Co., Pearl and Willoughby Streets, Brooklyn, will make enlargements in its steam-electric generating plant on Hudson Avenue during 1928, to increase the present capacity by 147,000 hp. Contracts for primary equipment are being let, and orders for auxiliary apparatus will be placed at an early date.

The Board of Village Trustees, Harriman, N. Y., is asking bids until Sept. 29 for equipment for a municipal water system, including motor-driven pumping unit for deep-well service, water softening equipment and accessories. H. J. Harder, 129 Market Street, Paterson, N. J., is engineer.

The Gatineau Power Co., operated by the International Paper Co., 100 East Forty-second Street, New York, for the development and operation of its power properties in Canada, is disposing of a bond issue of \$18,500,000 in the United States, a portion of the fund to be used for the purchase of nine hydroelectric generating plants in the Gatineau River district, Que., including extensions and improvements, with transmission line.

The Radio Electric Clock Co., 50 Church Street, New York, manufacturer of electric-operated clock mechanisms, has awarded a general contract to the Wilhelms Construction Co., 119 Division Street, Elizabeth, N. J., for a new one-story plant, 60 x 100 ft., and 40 x 100 ft., at Linden, N. J., to cost close to \$60,000 with equipment.

Vought & Williams, 363 Greenwich Street, New York, iron and steel products, have leased property at 443-45 Greenwich Street, and 34-38 Vesey Street, totaling about 40,000 sq. ft. of floor space, and will remove to this location where operations will be extended.

A. E. Sleight, Romaine Building, Paterson, N. J., archi-

tect, has revised plans for a two-story automobile service, repair and garage building, 210 x 250 ft., to cost upward of \$200,000 with equipment.

The plant and property of the Burnrite Coal Briquette Co., New Jersey Railroad Avenue and Avenue A, Newark, has been acquired at public sale by John Hancock, Philadelphia, said to be identified with John C. Hancock & Co., Ninth and Master Streets, that city, coal dealer and operator, for \$134,000, subject to approval by the Federal Court. The new owner is understood to be planning to operate the plant for the production of fuel briquettes.

Kantor Brothers, Inc., 205 Waverly Avenue, Newark, plumbing equipment and supplies, has completed plans for a new two-story storage and distributing plant, 102 x 200 ft., with shop and mechanical facilities, reported to cost about \$40,000 with equipment. A. J. Silberstein, 60 Park Place, is architect.

F. & L. Mongiello, 74 West Twenty-third Street, Bayonne, N. J., have plans for a one-story ice-manufacturing plant, 50 x 100 ft., to cost about \$45,000 with equipment.

The Public Service Electric & Gas Co., Public Service Terminal, Newark, has plans under way for a two-story addition to its power house at New Brunswick, N. J., to cost close to \$50,000 with equipment.

The Cosgrove Wire Cloth Co., Inc., 329 Main Street, Belleville, N. J., has been organized to expand the wire weaving plant of M. P. Cosgrove which has been in operation for six years. The finer grades of wire cloth, particularly monel and nickel, have been manufactured at the Cosgrove plant, but the new company will be in a position to supply any fine wire cloth from metals suitable for weaving.

The International Cardiograph Co., 113-115 Frelinghuysen Avenue, Newark, N. J., has been incorporated with capital stock of \$30,000 and is engaged in the manufacture of a portable Electrocardiograph, an instrument used in diagnosing by the medical profession. Frederic O. Hindle, president and general manager, was from 1914 to 1922 chief engineer for the firm of Charles F. Hindle at Ossining, N. Y., and from 1922 to 1926 was with the Cambridge Instrument Co., which succeeds to the business of Charles F. Hindle. J. O. Hindle, secretary and treasurer of the new company, was also in like capacities with the Hindle and Cambridge companies until July 1, 1927.

The Triplex Machine Tool Co., Hudson Terminal Building, 50 Church Street, New York, dealer in machine tools, will move to larger offices in the same building on Oct. 1, and will be located in suites 1382 and 1383.

Philadelphia

PHILADELPHIA, Sept. 19.

THE General Laundry Machinery Corporation, Philadelphia, comprising a recent merger of the Willey-Ellis Co., 210 North Thirteenth Street, Philadelphia, with plants at Columbia, Pa., and Chicago, and the Tolhurst Machine Works, Troy, N. Y., is planning for a bond issue of \$1,500,000, a portion of the fund to be used in connection with the consolidation and for development in production. In addition to the manufacture of laundry machinery, the company will produce specialized machinery for a number of basic industries.

The Quaker City Specialty Co., 1115 Ridge Avenue, Philadelphia, plumbing equipment and supplies, has awarded a general contract to the A. Raymond Raff Co., 1635 Thompson Street, for a three-story equipment storage and distributing building, with mechanical facilities, to cost about \$50,000. Clyde S. Adams, 2038 Spruce Street, is architect.

Ovens, power equipment, conveying and other machinery will be installed in the new multi-story plant to be erected at Philadelphia by the General Baking Co., 420 Lexington Avenue, New York, for which a general contract has been let to the William Steele & Sons Co., 124 North Fifteenth Street, Philadelphia, to cost \$750,000. An automobile service, repair and garage building for company trucks and cars will be constructed on adjoining site.

The Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, has concluded an agreement with the Pennsylvania Power & Light Corporation, Allentown, Pa., and the Public Service Electric & Gas Co., Newark, N. J., for a pooling of power facilities, providing for complete interchange of service between the three interests. A steel tower transmission line will be constructed from Siegfried, near Allentown, to a point in the vicinity of Philadelphia, about 50 miles, where a high-tension switching station will be built; from the latter point a steel tower line will be built to Roseland, vicinity of Newark, about 77 miles distant, where connection will be made with a similarly large power switching station; from Roseland, a steel tower transmission line will be constructed to Siegfried, about 82 miles, completing the net-work of transmission facilities for power from all three sources. The companies will have a gross

generating capacity of 2,250,000 kw., including the Conowingo hydroelectric power development of the Philadelphia company, now in course of construction. The new transmission system and switching stations are estimated to cost \$26,000,000 and are scheduled for completion in 1930. Work is planned to begin this fall on the new switching plant at Roseland, to cost approximately \$5,000,000 with machinery.

The Siner & McKay Brick Co., 4205 Chester Avenue, Philadelphia, F. McKay, general manager, has plans under way for new works in the vicinity of Lansdale, Pa., reported to cost upward of \$350,000 with machinery. A power house and mechanical drying facilities will be provided. H. H. Kline, 709 Chestnut Street, is architect.

The Lang Paper Co., Twenty-fourth and Callowhill Streets, Philadelphia, manufacturer of roofing and other prepared paper stocks, has purchased the former ship-building plant of Pusey & Jones, Inc., Gloucester, N. J., and will remodel for a new plant. The site of the present Philadelphia mill has been condemned by the city for parkway purposes and in the near future removal will be made to the new Gloucester plant, where production will be concentrated in the future.

Stockholders of the United Gas Improvement Co., Broad and Arch Streets, Philadelphia, have approved an increase in capital from 2,036,528 shares, par value \$50, to 2,130,088 shares, the enlarged capital having a current market value of \$247,090,208, a portion of the proceeds to be used for expansion and for the purchase of additional properties, including an interest in the Hartford City Gas Light Co., Hartford, Conn., and the Connecticut Gas & Coke Securities Co., New Haven, Conn., which controls the New Haven Gas Light Co. Through its subsidiary, the Connecticut Light & Power Co., the United Gas Improvement Co. will secure a substantial holding in a new gas generating plant now in course of construction by the Koppers Co., Pittsburgh, and affiliated interests, on the waterfront at New Haven, to be completed at a cost of \$9,000,000. Pipe lines will be built to furnish service from the plant to Hartford and other points in the State. Arthur W. Thompson is president of the United Gas company.

The Scranton Board of School Control, 425 Washington Avenue, Scranton, Pa., has authorized plans for an addition to the technical high school at Adams Avenue and Gibson Street, to cost about \$520,000 with equipment. Albert J. Ward, County Bank Building, is architect; Tudor Williams, Scranton Life Building, is engineer.

Additional mechanical equipment, including conveying, mixing, weighing and other machinery, will be installed by the Huber Baking Co., Ninth and Union Streets, Wilmington, Del., in connection with extensions and improvements in its plant, now under way, to cost about \$200,000. George F. Huber is president.

The Multiplex Mfg. Co., Berwick, Pa., is completing plans for the early construction of a new ice-manufacturing plant at East Berwick, where site has been acquired, to cost close to \$36,000 with machinery.

The Board of Education, Keystone Building, Philadelphia, is asking bids until Oct. 4 for hardware and other equipment for local schools. William Dick is secretary and business manager.

The Ideal Specialty Mfg. Co., Royersford, Pa., has been incorporated to acquire the plant of the Ideal Foundry & Machine Works at Royersford. The new company will carry on the manufacture of gray iron, brass and aluminum castings for the plumbing and heating trade and will also do a general jobbing business. D. G. Colley is president.

Buffalo

BUFFALO, Sept. 19.

THE Board of Education, Dunkirk, N. Y., will soon take bids on a general contract for a two-story vocational school, to cost close to \$100,000 with equipment. Oliver R. Johnson, Tenson Building, Jamestown, N. Y., is architect.

The Common Council, North Tonawanda, N. Y., is said to be planning the installation of two pumping plants, with electrically-operated pumping machinery and accessories, in connection with a proposed sewage system in the Martinsville and Wurlitzer sections of the city. A bond issue of \$359,000 has been approved for the project. Carl L. Oelkers is city engineer.

The Republic Motor Truck Co., Inc., Alma, Mich., is disposing of a bond issue of \$1,250,000, a portion of the proceeds to be used for the acquisition of the Linn Mfg. Corporation, Morris, N. Y., manufacturer of a heavy type hauling tractor of 75 to 100-hp. It is purposed to continue manufacture of the Linn tractor equipment with early expansion in present output. The Morris works, it is understood, will be maintained in service for this branch of production. O. W. Hayes is president of the Republic company.

The Board of Education, Kenmore, N. J., is said to be

The Crane Market

INQUIRY continues light and only a few sales of either overhead or locomotive cranes have been reported in the past week. The recent request of the Board of Transportation, New York, for estimates on furnishing cranes for the 207th Street and Tenth Avenue yards of the new subway, calls for a list of 34 cranes. Included are four 30-ton, one 15-ton, 13 jib cranes and a number of 5-ton cranes. Formal inquiry for these cranes is not expected for some time. In the locomotive crane field, the inquiry of the Erie Railroad for a used 25-ton locomotive crane and the New York Central inquiry for a crawl tread and a standard gage locomotive crane are still open. The International General Electric Co., Schenectady, N. Y., is reported about to close on two 15-ton overhead cranes for export. The Great Western Mfg. Co., Leavenworth, Kan., is in the market for a used 5-ton, 51-ft. span overhead traveling crane for handling ladles of molten iron in a foundry.

Among recent purchases are:

Central Railroad of New Jersey, 143 Liberty Street, New York, reported to have closed on a 12½-ton crawl-tread locomotive crane with the Link-Belt Co.

Huntingdon & Broad Top Mountain Railroad Co., Saxton, Pa., a 20-ton rebuilt Ohio locomotive crane from the Morris Engineering Co., New York.

Delaware & Hudson Co., Albany, N. Y., a used 25-ton Browning locomotive crane from the Grey Steel Products Co., New York.

Village of Rockville Center, Long Island, N. Y., a 15-ton, 60-ft. span hand power crane from a Western builder.

Anaconda Copper Mining Co., 25 Broadway, New York, a 40-ton overhead traveling crane from an unnamed builder.

Wisconsin Power Co., Milwaukee, a 15-ton, 28-ft. span hand power crane from H. D. Conkey & Co.

E. J. Sanger Co., Chicago, a 5-ton, 56-ft. span electric crane from a Western builder.

Mechanical Mfg. Co., Chicago, a 7½-ton special type electric crane from the Shaw Electric Crane Co.

Chicago Pneumatic Tool Co., Franklin, Pa., three 15-ton, one 10-ton and one 5-ton overhead cranes from a builder in the West.

planning the installation of manual training equipment in a proposed addition to the high school on the Delaware Road, to cost \$700,000. It is purposed to ask bids soon on a general contract.

The Lockport Light, Heat & Power Co., Lockport, N. Y., is planning the construction of a 6-in. pipe line from Tonawanda to Pendleton and Lockport, for transmission of coke oven gas from the first noted place, where source of supply will be furnished by the Semet-Solvay Co.

Frank A. Spangenberg, 250 Delaware Avenue, Buffalo, architect, has revised plans for a two-story automobile service, repair and garage building at Dunkirk, N. Y., to cost close to \$75,000 with equipment.

The Willard Machine Works, Inc., 73 Forest Avenue, Buffalo, has acquired the factory at 1400 West Avenue, formerly occupied by the Houde Engineering Corporation, manufacturer of shock absorbers, and will take immediate possession. The new owner will occupy for expansion and will install additional equipment. It is understood that the present plant will be removed to this location. The Houde company recently removed its plant to Winchester and Delevan Avenues, where facilities have been arranged for increased production.

The Bennett Heater Co., Norwich, N. Y., has been organized to manufacture fireplace heaters and kindred products and will occupy a portion of an addition under construction at the plant of the Norwich Wire Works.

New England

BOSTON, Sept. 19.

BUSINESS with most machine tool dealers is practically at a standstill, particularly with those handling only new equipment. The largest sale of used tools reported recently included a No. 3 plain Milwaukee milling machine, a 20-in. engine lathe, and a bench milling machine to a Greater Boston shop. Used tool houses have few new inquiries. New tool dealers, on the other hand, have considerable business under negotiation that gives promise of closing within a few weeks.

Plans have been completed for a pumping station for Barnstable, Mass. F. L. Whitcomb, Ocean View, Cotuit, Mass., is in charge of the project. George Clements, 329 Main Street, Hyannis, is the engineer. Pumps and miscellaneous equipment will be required.

Work will start immediately on a one-story, 18 x 100 ft., addition and alterations by the Industrial Tube Corporation, 35 Lane Street, Waltham, Mass. Horace J. Lanson will supervise the work. Plans are private.

The American Electrical Works, Phillipsdale, R. I., has awarded a contract to the Austin Co. for the construction of a one-story, 77 x 82 ft., rod mill and a cable plant to have 17,890 sq. ft. of space. Plans are private.

E. H. Corbett, 70 Bedford Street, and Joseph J. Higgins, Fall River, Mass., architects, are preparing plans for a three and six-story technical school, 145 x 238 ft., for that city to cost, with equipment, \$1,000,000. Harry Monks is mayor and Dr. William Pritchard chairman of the school committee.

Thomas J. H. Pierce, City Hall, Providence, R. I., has completed plans for a municipal repair and paint shop for

the fire department at Dexter and Whitmarsh Streets. J. E. Dunne is mayor.

McLaughlin & Burr, 88 Tremont Street, architects, are taking bids on a high school addition for Walpole, Mass., to contain manual training shops. J. S. Leach is chairman of the building committee.

Revised plans for a one-story and basement mill addition are being completed for the Superior Cabinet Works, 93 Newell Avenue, Pawtucket, R. I. R. L. Maretor is president.

Work will start at once on a one-story, 50 x 50 ft., repair shop at 60 Amory Street, Roxbury district, Boston, for Fred J. Gilduz, 31 Boylston Street, Jamaica Plain. Plans are private.

The Chapman Valve Mfg. Co., Indian Orchard, Mass., has been appointed exclusive sales agent in the United States, Canada, Mexico and Cuba for the sale of sluice gates, shear gates, tide flap valves, etc., manufactured by the Coffin Valve Co., Boston.

R. J. Kingsbury, Inc., Devon, Conn., has been organized to deal in boilers, radiators, valves and heating specialties, and will be in the market for these products.

The Atlas Iron Works, 245 Island Brook Avenue, Bridgeport, Conn., has awarded a general building contract to the S. W. Hubbell Building Co., Knowlton Street, for a one-story addition, 50 x 100 ft., to cost about \$18,000 with equipment.

The National Radiator Co., 96 Arlington Street, Framingham, Mass., is considering plans for a one-story addition, to cost about \$45,000 with equipment. C. A. Robertson is general manager.

William Drummey, 80 Boylston Street, Boston, architect, has completed plans for a one and two-story automobile service, repair and garage building, 100 x 122 ft., at Cambridge, to cost close to \$100,000 with equipment.

The Brass City Plumbing Supply Co., Waterbury, Conn., has purchased property on Bank Street and plans the early construction of a new storage and distributing plant, with pipe cutting and threading department and other facilities.

South Atlantic States

BALTIMORE, Sept. 19.

THE Union Furniture Co., High Point, N. C., is planning to rebuild the portion of its plant destroyed by fire Sept. 10, with loss reported upward of \$350,000 including machinery.

Frank J. Suter, 658 Bartlett Avenue, Baltimore, is desirous of getting in touch with manufacturers of funnel-shaped metal novelties, particularly of aluminum or tin.

The Lexington Water Power Co., Lexington, S. C., operated by W. S. Barstow & Co., 50 Pine Street, New York, will soon begin the construction of its proposed hydroelectric generating plant on the Saluda River, near Columbia, S. C., to cost in excess of \$10,000,000 with transmission system. Contract for power dam has been let to the Arundel Corporation, Pier 2, Pratt Street, Baltimore. A railroad will be built from Irmo, S. C., to the site of the dam.

The State Board of Public Works, Annapolis, Md., has authorized the construction of a new power plant and mechanical laundry at the Maryland Training School for Boys, estimated to cost \$125,000. An appropriation of \$180,000

is also being arranged for a mechanical shop, and mechanical and electrical equipment for the House of Correction.

The Standard Sand & Gravel Co., 426 Greene Street, Augusta, Ga., is considering the installation of a second production unit at its properties in the vicinity of Blum, Ga., including power shovel, washing and screening equipment, dump cars, etc.

The Town Council, Victoria, Va., is asking bids until Oct. 4 for equipment for a municipal waterworks and sewage system, including four deep-well pumping units, steel tank and tower, tanks, valves, etc. The J. B. McCrary Engineering Corporation, Atlanta, Ga., is engineer.

The Hackley-Morrison Co., 204 North Jefferson Street, Richmond, Va., machinery dealer, has inquiries out for a 10 to 15-kw. generator, d.c. type, with pulley, with or without switchboard; one steam shovel, crawler or tractor type (former preferred), $\frac{1}{2}$ to $\frac{3}{4}$ -yd. capacity, Erie type desired; small tool lathe, 12 x 14 x 6 ft. with quick change gears; stamping press with ram about 12 x 12 in.; band resaw; trimmer, 18 in.; and 50 to 60-hp. motor, slip-ring type, with base, pulley and starter.

The Virginia-Carolina Chemical Co., Richmond, Va., manufacturer of industrial chemicals, etc., is said to be planning extensions and improvements in its plant at Shreveport, La., to cost approximately \$75,000 with equipment.

The Obrecht-Lynch Corporation, 316 Light Street, Baltimore, is considering the construction of a new shipyard on waterfront site, to include machine shop, boiler and plate shop, mold loft and other structures, to cost close to \$100,000 with equipment. Plans will probably be drawn within 60 days.

The Board of Education, Bedford, Va., is considering the installation of manual training equipment in a proposed two-story high school to cost \$175,000, for which foundations will soon be laid. Heard & Chesterman, People's National Bank Building, Lynchburg, Va., are architects.

The Standard Fertilizer Co., Williamston, N. C., affiliated with the Standard Wholesale Phosphate Co., Continental Building, Baltimore, will proceed with the erection of a new local plant, 100 x 200 ft., to cost in excess of \$75,000 with equipment. The company was organized recently by George A. Whiting and C. B. Mitchell, Sr., Continental Building.

Barber & Ross, Inc., Eleventh and G Streets, N. W., Washington, hardware and kindred products, has plans for a new one-story storage and distributing plant, to cost close to \$50,000 with equipment.

R. P. Johnson, Wytheville, Va., machinery dealer, has inquiries out for a number of woodworking tools, including stave saws, Whitney type; edgers, equalizers, etc.; also for a 200-hp. return tubular boiler and 125-hp. Corliss type engine, or slide valve.

C. W. Singleton, Dothan, Ala., and associates are planning the erection of an ice-manufacturing plant at Valdosta, Ga., where site, 120 x 150 ft., has been acquired. The initial unit will be one story and to cost close to \$40,000 with equipment.

The Standard Metal Weather Strip Co., Baltimore, has been organized to manufacture and install metal weather strips. A factory and main office are maintained at 1511 Guilford Avenue.

Pittsburgh

PITTSBURGH, Sept. 19.

MACHINE tool dealers still are making a good many quotations, but orders generally are much fewer than inquiries. There is considerably more business in parts and repairs than in new machines, but hope is strong that some business that has been worked up will be closed this week at the Cleveland machine tool exposition. The Chicago Pneumatic Tool Co., which is building a new plant at Franklin, Pa., is expected to supplement its recent crane purchases by some machinery and tool orders.

The Standard Seamless Tube Co., 313 Sixth Street, Pittsburgh, is reported to be contemplating a new branch plant at Memphis, Tenn., to be one-story, 130 x 500 ft., to cost close to \$175,000 with equipment.

The Pittsburgh Transformer Co., Columbus and Preble Streets, Pittsburgh, manufacturer of electric transformers, etc., is said to be planning to rebuild the portion of its plant in the Manchester district recently damaged by fire, with loss reported at close to \$30,000 including equipment.

The Board of Education, Scottsdale, Pa., is said to be planning the installation of manual training equipment in a proposed two-story addition to the high school, to cost about \$150,000. W. G. Eckles, Lawrence Savings & Trust Building, New Castle, Pa., is architect.

The Hope Natural Gas Co., 545 William Penn Highway,

Pittsburgh, is said to be planning extensions and improvements in its system in the vicinity of Clarksburg and Parkersburg, W. Va., including pipe line construction. The company is reported to have concluded arrangements for the purchase of the West Virginia natural gas properties of the Grasselli Chemical Co., Cleveland. H. C. Cooper is chief engineer.

The City Council, Parkersburg, W. Va., is asking bids until Oct. 10 for equipment for a waterworks in the River-side section, including pumping machinery, pipe lines, etc. Morris Knowles, Inc., Westinghouse Building, Pittsburgh, is engineer.

The Auto Supply Co., Noble Avenue, Crafton, Pa., has plans for a two-story service, repair and garage building to cost close to \$90,000 with equipment. J. Franklin Kuntz, Westinghouse Building, Pittsburgh, is architect.

The Chaplin-Fulton Mfg. Co., 36 Penn Avenue, Pittsburgh, manufacturer of brass, bronze and other metal castings, has asked bids on a general contract for a three-story addition, 30 x 100 ft., to cost approximately \$75,000 with equipment. Bernard H. Prack, Martin Building, is architect and engineer.

The West Virginia Water Service Co., Charleston, W. Va., has arranged for the sale of a bond issue of \$225,000, a portion of the proceeds to be used for extensions and improvements in pumping plants, systems, etc.

Chicago

CHICAGO, Sept. 19.

THE local machine tool market is finding encouragement in business that may follow from the exhibition at Cleveland this week. Many buyers state that they will defer purchases until later in the month. The volume of inquiry reaching the trade is growing, but it is the lack of actual orders that is proving a disappointment to dealers. Agricultural implement manufacturers are still the largest single group of buyers who are showing interest in machine tools. Railroad requirements are small and scattered and in many instances are for small shops. The Chicago, Milwaukee & St. Paul is asking for prices on a 44-in. motor-driven boring mill, either new or rebuilt. Deliveries on standard tools are satisfactory. One manufacturer of lathes has announced a revision of prices.

The Advance Pattern & Foundry Co., 2734 West Thirty-sixth Place, Chicago, is planning the erection of a two-story manufacturing building on property recently purchased.

The Whiting Corporation, Harvey, Ill., has placed contract with Schmidt Brothers, Chicago, for the construction of a foundry addition, 70 x 160 ft.

Plans have been filed by the American Casting Co., 6835 South Irving Avenue, Chicago, for a one-story foundry, 72 x 125 ft., on adjoining site, to cost about \$21,000 with equipment. A. G. Lund, 453 West Sixty-third Street, is architect.

The Great Northern Railway Co., 524 Second Avenue South, Minneapolis, Minn., has filed plans for an addition to its engine house at 400-58 Taylor Street, to include extensions in repair facilities. General contract has been let to the William Baumeister Co., Pioneer Building, St. Paul, Minn.

The A. E. Staley Mfg. Co., Decatur, Ill., manufacturer of corn oil, refined oils, glucose, etc., has arranged for a bond issue of \$6,000,000, a portion of the proceeds to be used for expansion. The company has work under way on an addition.

The A. A. Vickers Petroleum Co., Central Building, Pueblo, Colo., Ray W. Jewel, general manager, has plans under way for an addition to its local oil-blending plant, to cost close to \$35,000 with equipment.

The Well-McLain Co., 641 West Lake Street, Chicago, manufacturer of boilers, heating equipment, etc., has acquired property, 120 x 170 ft., at 710-20 Fulton Street, improved with two one-story buildings, and will occupy for expansion.

The National Chair Co., 1827 Broadway, Rockford, Ill., has awarded a general contract to the Holmquist & Peterson Co., Swedish-American Bank Building, for a one-story addition, 40 x 130 ft.

The Minneapolis Mfg. Co., East Hennepin and Fifth Avenues, S. E., Minneapolis, Minn., has filed plans for a power house at its plant to cost about \$60,000 with equipment. The Pillsbury Engineering Co., 2344 Nicollet Avenue, Minneapolis, is engineer.

Bids will be asked in about 60 days on a general contract for the erection of the proposed new fuel briquette

and power plant of the Lehigh Briquetting Co., Lehigh, N. D., for which Ralph W. Richardson, Zenith Building, St. Paul, Minn., engineer, is in charge. The works will consist of a main producing unit, with coal-crushing plant, bins, power house, pumping station, machine repair shop, and other structures. The entire project will cost approximately \$500,000 with machinery.

The J. P. Seeburg Piano Co., 1510 Dayton Street, Chicago, manufacturer of pianos, mechanisms, etc., is considering the erection of a three-story addition, 93 x 175 ft., to cost upward of \$100,000 with equipment.

The Barber-Coleman Co., River and Loomis Streets, Rockford, Ill., manufacturer of twist drills, reamers, etc., has filed plans for a power plant at its factory, 85 x 106 ft., to cost about \$50,000 with equipment.

The American Farm Machinery Co., Como Avenue and the west city limits, St. Paul, Minn., has awarded a general contract to the Arnold Construction Co., Guardian Life Building, for a one-story addition, 56 x 95 ft.

William S. Ford & Co., engineers and managers, with offices in Chicago, Minneapolis, St. Paul and Milwaukee, announce an association with McCaffery, MacKay & Oesterle, consulting metallurgists of Madison, Wis., offering consulting and operating services in the production of gray iron, alloy irons, special irons, malleable iron and steel. They have also become associated with Clement A. Hardy in the design, construction and operation of foundry and industrial plants. The main office of the firm is at 30 North La Salle Street, Chicago.

The Coleman Lamp & Stove Co., Wichita, Kan., has purchased 136,000 sq. ft. of industrial property in the Clearing Industrial district, Chicago, where it plans to spend \$350,000 for a new plant.

The Automatic Humidifier Co., Cedar Falls, Iowa, has been organized with a capital of \$50,000 and has started manufacturing. The product is an air moistener to be fitted on any warm air furnace. It is controlled by thermostat, being connected to the water pipe. Equipment required has been purchased.

Detroit

DETROIT, Sept. 19.

THE Monroe Auto Equipment Mfg. Co., Monroe, Mich., is considering the construction of an addition, to cost more than \$65,000 with equipment. The company recently increased its capital to \$1,500,000 for expansion.

The Michigan Steel Castings Co., 1886 Guion Street, Detroit, is reported to be planning a one-story foundry addition to cost in excess of \$30,000 with equipment.

The Board of Water Commissioners, 176 East Jefferson Street, Detroit, is asking bids until Oct. 5 for one motor-driven centrifugal pumping unit, with capacity of 10,000 gal. per min., including accessory equipment, for the municipal waterworks, delivery to be complete by Jan. 1, 1928. George H. Fenkell is general manager and chief engineer. The board is arranging to request the City Council for approval of an appropriation of about \$500,000 for the construction of a new low lift pumping station for the waterworks.

The Utilities Engineering Co., Muskegon, Mich., recently organized, is completing plans for a new gas generating plant on site near the city, to include two batteries of by-products coke ovens, purifier, gas holder, coke screening equipment, etc. The entire project is reported to cost in excess of \$400,000 with equipment.

The Detroit City Service Co., Detroit, care of Harry J. Redwood, Roslyn Road, president, recently chartered to take over a group of nine ice-manufacturing plants and a number of cold storage plants, is disposing of a note issue of \$1,250,000, a portion of the proceeds to be used for expansion, including additional facilities for increased production.

The Boydell Brothers White Lead & Color Co., 432 East Lafayette Street, Detroit, has asked bids on a general contract for its proposed new plant units with power house, to cost upward of \$200,000 with equipment. Halpin & Jewell, Hammond Building, are architects. John G. Wood is president.

The Owosso Casket Co., Owosso, Mich., has completed plans for a one-story addition, to cost about \$25,000 with equipment. Weston & Ellington, Stroh Building, are architects.

The Board of Education, Monroe, Mich., plans the installation of manual training equipment in a new three-story high school to cost about \$750,000. Superstructure will soon begin.

The Chevrolet Motor Co., Flint, Mich., has awarded a general contract to the H. G. Christman Co., Lansing, Mich., for a new plant unit, to cost about \$1,000,000 with equipment; the expansion will include a new pumping plant.

The Hercules Rim Tool Corporation, St. Joseph, Mich., has tentative plans for an addition to double, approximately,

the present floor space. New equipment will be installed. The expansion is reported to cost more than \$50,000.

The J. C. Glenzer Co., 6463 Epworth Boulevard, Detroit, which has specialized in the manufacture of utility tools for the past 10 years, has added to its line the Wiard quick-change chuck, formerly manufactured by the American Standard Tool Works, Detroit. The Glenzer company has taken over patents, jigs, fixtures, gages, machinery, etc., and manufacture of the chucks will begin at once. Standard sizes of chucks and collets will be carried in stock.

The Adjustable Steel Spring Co. has been organized to take over the Cooper Steel Spring Co., 477 Charlotte Avenue, Detroit, manufacturer of adjustable automobile springs.

Milwaukee

MILWAUKEE, Sept. 19.

WITH the trade occupied by the National Machine Tool Exposition this week, local activity is expected to be slack, but the results of the Cleveland show are expected to stimulate demand. The call for equipment has shown some improvement, but it lacks volume, and orders for the most part are for single items. It is believed that considerable business from the automotive industries is being held awaiting developments of the new Ford car. Railroad demand is of very small proportions, and a moderate call from general machine shops is the principal sustaining factor. Official reports describe employment in local shops as not much below the peak of the year and letdowns in some lines were balanced by increased activity in others during the past month.

The Logemann Brothers Co., 3130 Burleigh Street, Milwaukee, manufacturer of hydraulic and mechanical baling presses, scrap handling devices, etc., is deferring the erection of a proposed one-story shop addition, 50 x 200 ft., pending the progress in the grade separation project of the city of Milwaukee and the Chicago, Milwaukee & St. Paul Railway. It is believed that work may be started late this year or early in 1928. Plans have been completed by Eugene R. Liebert, architect, 49 East Wells Street, local.

A. P. Warner, Beloit, Wis., manufacturer of automotive products, has incorporated the Warner Electric Brake Co., capital stock \$1,000,000, under the laws of Illinois, to undertake the manufacture of a newly developed internal expanding mechanical braking system for automobiles. Headquarters will be maintained at the Beloit plant for the present. Mr. Warner was the original owner of the Warner Instrument Co., Beloit, which later was merged into the Stewart-Warner Speedometer Corporation, and more recently has been manufacturing trailers and developing other inventions.

Frank L. Pierce, for many years operating a general machine shop at 401 Mill Street, LaCrosse, Wis., as the Franklin Iron Works, has incorporated under the style of Franklin Iron Works, Inc., with a capital stock of \$10,000. Ownership and management remain unchanged, but plans are being formed for enlargements.

W. W. Oeffeln, Inc., 108-110 East Wisconsin Avenue, Milwaukee, has been awarded the general contract for the construction of a \$500,000 condensary plant for the Great Atlantic & Pacific Tea Co., New York, at Manitowoc, Wis.

The D. J. Murray Mfg. Co., 1002 Third Street, Wausau, Wis., manufacturer of logging and lumber manufacturing machinery, and doing a general machine shop business, is starting work on alterations to the present shops and the erection of a manufacturing addition. The Wausau Iron Works is engineer and general contractor.

The Northern Coal & Dock Co., Superior, Wis., has started work on the construction of an additional coal screening plant at its docks on Connors Point, to cost about \$65,000. C. E. Kielly is general superintendent.

The Board of Industrial Education, Beloit, Wis., has accepted the bid of John Schneiberg, 947 Bluff Street, local, for the general construction of the new Beloit Vocational School, 153 x 160 ft., two stories and basement, costing about \$250,000. The architects are Merman & Skogstad, LaCrosse, Wis. Equipment probably will not be purchased until next spring. E. D. Arnold is secretary of the board.

The Common Council, Crandon, Forest County, Wis., has engaged the Jerry Donohue Engineering Co., Sheboygan, Wis., to design a new waterworks and sewage disposal plant to cost \$65,000. Bids will be taken early in the spring. Besides pumping equipment, motors, elevated tower, etc., the project will require about 18,000 lin. ft. of 4 to 8-in. water pipe. Walter Netzel is city clerk.

The Common Council, Black River Falls, Wis., is asking bids until Oct. 4 for one new chlorinator unit with a 300-gal.

pumping engine and automatic control, for the municipal waterworks plant. Harry Boyer is city clerk.

The Board of Education, Neenah, Wis., is asking bids until Oct. 11 for the complete construction of a new senior high and vocational school and gymnasium building, designed by John D. Chubb, architect, Chicago, and estimated to cost \$350,000. Bids for shop tools and other equipment will be taken later. Mrs. J. F. Gillingham is secretary to the board.

The Belle City Mfg. Co., Racine, Wis., manufacturer of individual threshing outfits, crawler attachments for Fordson tractors, etc., has completed a reorganization and is resuming production on virtually a capacity scale. The new officers elected Sept. 13 are: President, H. A. Read; vice-president, W. J. Tostevin; secretary-treasurer, George A. Nelson; assistant secretary-treasurer, H. A. Schultz. Mr. Read has been appointed general manager.

Cincinnati

CINCINNATI, Sept. 19.

ALTHOUGH several important builders report increased sales the past week, the machine tool market still remains quiet. Inquiries, however, are more numerous and indications are that bookings in September will be better than those of August. A Detroit automobile manufacturer has bought 14 lathes from a local company, this transaction raising to a total of 39 the number of machines ordered by this buyer. Another automobile maker has contracted for seven lathes. A Cincinnati manufacturer has sold seven 20-in. motor-driven engine lathes for installation on Federal revenue cutters and four extension bed gap lathes for use on Government scout cruisers. The Cincinnati Street Railway Co. is beginning to make purchases of tools for its new car repair shops, the total expenditure to be about \$100,000. The Santa Fe has taken a rod boring machine and the Southern Pacific a driving wheel press, while the Griffin Wheel Co. has bought a wheel press.

The Board of Education, Columbus, Ohio, contemplates the installation of manual training equipment in a new two-story and basement junior high school at Indianola Park to cost \$350,000, for which revised plans are being drawn by H. D. Smith, 207 East State Street, architect.

The Air Corps, Material Division, Wright Field, Dayton, Ohio, has postponed the closing of bids for welding equipment, under circular 76, from Sept. 14 to Oct. 5. Bids will be received until Sept. 29 for 250 landing-gear assemblies and 100 landing-gear bushings, circular 83.

The Brown-Williamson Tobacco Co., Louisville, is planning the construction of a power house at its new multi-story tobacco and cigarette factory. The entire project will cost about \$500,000 with equipment. Conveying and other mechanical equipment will be installed.

The Fred Dahnke Ice Co., Main and Division Streets, Union City, Tenn., is inquiring for a full Diesel oil engine, 100 hp., direct-connected to generating unit.

F. O. Elchelberger, city manager, Dayton, Ohio, is planning an early call for bids for equipment for a proposed sewage disposal plant near the Eby Road, including pumping plant, two mechanical shops and laboratories, conveying equipment, etc. The entire project will cost about \$1,300,000. Metcalf & Eddy, 14 Beacon Street, Boston, are consulting engineers.

The Boyce Mfg. Co., Chattanooga, Tenn., recently formed with a capital of \$250,000 by John Fowler and R. K. Haskew, 703 Broad Street, has arranged for a lease of the plants of the Signal Furniture Co., East Chattanooga, and will operate for the manufacture of desks and kindred products. Extensions and improvements are under consideration, including the installation of additional equipment.

The Board of Education, Nashville, Tenn., plans the installation of manual training equipment in a new group of five junior high schools to be located in different parts of the city, for which a fund of about \$800,000 is available. Plans will be drawn for the school on Jones Avenue by George D. Waller, architect; for East Nashville, by C. K. Colley, architect; West Nashville, by Asmus & Clark, architects; for annex to the Tarbox junior high school, by Henry C. Hibbs, architect, and for a junior high school for negroes by McKissack & McKissack, architects, all of Nashville.

W. E. Brock, president of the Century Co., 1111 Chestnut Street, Chattanooga, Tenn., is at the head of a project to construct two automobile service, repair and garage buildings, each to cost approximately \$100,000 with equipment.

The Bluff City Caverns Co., Bluff City, Tenn., care of G. W. Montgomery, McLean, Va., president, is planning the

purchase of two water-wheel generator sets, each with capacity of 50 kw-hr., for installation on local development; also for a pumping unit for water service.

The Hamilton Caster & Mfg. Co., Hamilton, Ohio, has plans maturing for an addition to cost about \$35,000 with equipment. J. Weigel is president.

Cleveland

CLEVELAND, Sept. 19.

MACHINE tool business was generally light during the week, sales being almost wholly confined to single items. Turret lathes continue to move fairly well in single orders and makers expect that September sales will exceed those in August.

The Cleveland Board of Education has issued the following list for the Cleveland Trade School:

Two 12-in. lathes.
One 14-in. lathe.
One plain milling machine.
One surface grinder.

The Steiner Brothers, Lima, Ohio, have purchased one 24-in. motor-driven shaper.

The Saxon Die & Stamping Co., 122-24 Southard Avenue, Toledo, Ohio, has been organized to manufacture dies and stampings, particularly for the automotive industry. It has purchased a factory adequately equipped for present requirements.

The Superior Screw & Bolt Co., 3654 East Ninety-third Street, Cleveland, is considering the erection of a one-story addition, reported to cost about \$32,000.

The Sun Rubber Co., Barberton, Ohio, has awarded a general contract to the Austin Co., Cleveland, for plant units to cost about \$75,000 with equipment.

The Butler Mfg. Co., 1812 East Twenty-fourth Street, Cleveland, manufacturer of vacuum street sweepers and parts, is arranging for the sale of a stock issue to total about \$645,000, a portion of the fund to be used for increased production facilities and other expansion.

The F. C. Thornton Co., 6712 Union Avenue, Cleveland, manufacturer of sheet metal products, has awarded a general contract to the Industrial Construction Co., 308 Euclid Avenue, for a one-story addition, 35 x 140 ft., to cost approximately \$45,000 with equipment.

The Owen Bucket Co., Breakwater Avenue, Cleveland, is reported to be considering a one-story addition to cost more than \$25,000.

The Board of Education, Youngstown, Ohio, is said to be planning the installation of manual training equipment in a new junior high school to cost about \$335,000, for which superstructure will soon begin. Paul Boucherle and W. Canfield, Terminal Building, are associated architects.

The River Smelting & Refining Co., 4195-99 Bradley Road, Cleveland, has filed plans for a one-story addition, 48 x 60 ft., to cost about \$35,000 with equipment.

St. Louis

ST. LOUIS, Sept. 19.

THE American Pulverizer Co., Eighteenth and Austin Streets, St. Louis, has awarded a general contract to the W. C. Harting Construction Co., International Life Building, for a new one and two-story plant, 80 x 140 ft., on site recently acquired, to cost upward of \$50,000 with equipment. It will be used for the manufacture of grinding and pulverizing machinery and parts.

The Texarkana Airport Co., Texarkana, Ark., has acquired a tract of about 100 acres on the New Boston-Texarkana Highway, as a site for a proposed airport, including hangars, repair shops, oil houses and other buildings. The entire project is reported to cost in excess of \$70,000 with equipment.

The Grace Sign & Mfg. Co., 3601 South Second Street, St. Louis, Paul R. Grace, head, has asked bids on a general contract for a one-story plant, 75 x 260 ft., to cost about \$75,000 with equipment.

The Common Council, Paris, Ark., plans extensions and improvements in the municipal electric light and power plant, including the installation of additional equipment.

The Schneider Red Granite Co., 1224 Central National Bank Building, St. Louis, A. S. Kubu, president, plans the installation of quarrying machinery and auxiliary equipment on a tract of about 40 acres, recently acquired. The initial development is reported to cost about \$140,000 with machinery. Complete transportation facilities will be provided.

The Crown Mfg. Co., 117-19 Bowen Street, St. Louis, manufacturer of automobile equipment, has awarded a

general contract to William Pfefferkorn, Chaffee, Mo., for a one-story branch plant at Chaffee, 75 x 150 ft., to cost about \$24,000 with equipment.

The Simms Oil Co., Smackover, Ark., has work under way on an addition to its local refinery for lubricating oil production. The company will rebuild the portion of its main treating plant recently destroyed by fire with loss reported at \$20,000, including equipment.

The Woods Brothers Corporation, Lincoln, Neb., is completing arrangements for the immediate construction of its shipbuilding plant at Kaw Point on the Kaw River, near Kansas City, Mo., to be used largely for barge and similar type craft construction, to cost close to \$100,000 with equipment. Guy E. Stanley is vice-president and general manager.

The Empire District Electric Co., Joplin, Mo., is said to be planning the construction of a new automatic power substation at Tenth and Wall Streets, to cost more than \$200,000 with equipment. The company also proposes to make extensions in its transmission lines in the vicinity of Miami, Okla.

The Arkansas Utilities Co., Helena, Ark., is planning for extensions and improvements in its power plant to cost about \$150,000. Additional equipment will be installed to double the present capacity.

Gulf States

BIRMINGHAM, Sept. 19.

ATRACT of about 20 acres in the Hooker's Point section has been acquired by the Tampa Electric Co., Tampa, Fla., as a site for a proposed steam-operated electric generating plant, to cost more than \$3,000,000 with transmission system. Plans will be drawn by Stone & Webster, Inc., 49 Federal Street, Boston, engineer, and construction will be supervised by that organization.

The Dixie Gulf Gas Co., Port Arthur, Tex., recently formed under Delaware laws, is disposing of a bond issue of \$9,500,000, the proceeds to be used in part for the construction of a pipe line from a point near Shreveport, La., to Houston and Port Arthur, Tex., totaling about 300 miles, for natural gas transmission. A number of compressor stations will be built along the route. The northern terminus of the line will connect with the system of the Reserve Natural Gas Co. of Louisiana. It is scheduled for completion in February, 1928. Construction will be in charge of the Hope Engineering & Supply Co., Mount Vernon, Ohio. The Dixie company will also operate a plant for the production of gasoline from natural gas. W. L. Moody, III, and O. R. Seagraves, Port Arthur, head the company.

Backus & Son, Fort Pierce, Fla., have begun preliminary work for a new shipyard on the Indian River, to be given over largely to the construction and repair of light craft, including yachts, etc., as well as barges.

The Alamo Iron Works, Inc., Santa Clara Street, San Antonio, Tex., is said to be planning the construction of a branch plant at Corpus Christi, Tex., with main unit, 130 x 300 ft. The entire project will cost close to \$85,000 with equipment.

E. R. Mendez, 4036 St. Charles Avenue, New Orleans, head of the Cuban Rock Asphalt Co., Inc., plans the purchase of equipment for installation at quarries near Havana, Cuba, including drilling and crushing machinery, electrical equipment, railroad equipment and mining cars, mixing machinery, etc.

The Birmingham Galvanizing Co., Birmingham, recently organized, will break ground this month for the initial unit of its new steel galvanizing plant on a 10-acre tract, to cost upward of \$75,000 with equipment. Additional units will be constructed later.

The Central Power & Light Co., San Antonio, Tex., is said to be planning extensions and improvements in its ice-manufacturing and cold storage plant at Beeville, Tex., including the installation of additional equipment, to cost more than \$50,000.

A. A. Snell, Jordan Hotel, Marfa, Tex., is at the head of a project to construct and operate a plant for the production of potash, sodium nitrate, etc., in the vicinity of Candelaria, Presidio County, Tex., where a tract of about 4000 acres has been secured. A company, capitalized at \$500,000, will be organized to carry out the enterprise. A refining plant will be built. Mining equipment and transportation facilities will be installed. The project will cost in excess of \$150,000.

The Louisiana Power & Light Co., Columbia, La., recent purchaser of the local municipal electric light and power plant, is said to be planning the construction of a one-story ice-manufacturing plant, to be operated in conjunction with the power station.

C. S. Porter, 1115 Thirty-fifth Street, Galveston, Tex., is said to be completing plans for a new one-story plant for the production of wire nails and kindred products, to cost in excess of \$40,000 with equipment.

The Chamber of Commerce, Pyote, Tex., is at the head of a project to construct and operate a local ice-manufacturing and cold storage plant, with initial unit to cost more than \$45,000 with machinery.

The Prairie Oil & Gas Co., Independence, Kan., a subsidiary of the Standard Oil Co. of New Jersey, 26 Broadway, New York, is said to be completing plans for the construction of a pipe line from a point near Amarillo, Tex., to the city limits of Denver, Colo., about 365 miles, for natural gas supply to the Public Service Co. of Colorado, an interest of the Cities Service Power & Light Co., 60 Wall Street, New York. A number of compressor stations will be built along the route. The line will be from 20 to 24 in. in diameter, and is estimated to cost more than \$25,000,000.

The Witherspoon Oil Co., Alamo and Sixth Streets, San Antonio, Tex., has plans for a new two-story storage and distributing plant, to cost about \$60,000 with equipment.

M. Bussler & Co., Inc., New Orleans, recently organized with a capital of \$600,000 to operate dehydrating plants, has acquired a three-story building at 1204-8 Decatur Street, and will remodel and install machinery at an early date. Expansion will be carried out at an existing plant in the Westwego section, including the installation of new machinery. The entire project will cost more than \$80,000 with equipment.

Indiana

INDIANAPOLIS, Sept. 19.

CONTRACT has been let by the American Steel & Wire Co., 208 South LaSalle Street, Chicago, to the Krebay Construction Co., City Trust Building, Indianapolis, for a one-story addition to its plant at Anderson, Ind., 350 x 350 ft., to cost \$500,000. It will be equipped for the production of welded fabric steel wire.

Ovens, power equipment, conveying and other machinery will be installed in the new one- and two-story and basement plant, 150 x 200 ft., to be erected by the White Baking Co., Merchants Bank Building, Indianapolis, at St. Louis, to cost about \$300,000. Work will soon begin. The W. E. Long Co., 155 North Clark Street, Chicago, is engineer.

J. D. Adams & Co., 217 South Belmont Avenue, Indianapolis, manufacturers of road-building machinery, have awarded a general contract to the Hall Construction Co., Board of Trade Building, for a one-story addition, 150 x 265 ft., to cost close to \$50,000 with equipment.

The Westinghouse Electric & Mfg. Co., Pole Division, Notre Dame Street, South Bend, Ind., has asked bids on a general contract for a one-story plant unit at St. Louis, for the production of concrete lighting standards, reported to cost in excess of \$80,000 with equipment. The engineering department of the company, East Pittsburgh, Pa., is in charge.

The Kentucky Utilities Co., Tell City, Ind., is said to be planning the construction of an addition to its local steam-operated electric power plant, including installation of additional equipment, to cost more than \$50,000.

The Indianapolis Water Co., 113 Monument Circle, Indianapolis, has plans for a two-story automobile service, repair and garage building for company motor trucks and cars, to cost about \$65,000 with equipment. Frank C. Jordan is secretary.

The Leedy Mfg. Co., 1033 East Palmer Street, Indianapolis, manufacturer of musical instruments, has awarded a general contract to the John R. Curry Construction Co., Empire Life Building, for a three-story addition to its factory, 35 x 51 ft., to cost about \$38,000 with equipment. C. H. Strupe is company engineer.

The Roxana Oil Co., Evansville, Ind., has plans for a new storage and distributing plant on East Columbia Street, to cost about \$50,000 including equipment. A one-story repair shop will be constructed at the same location.

The Grimes Foundry Co., Bluffton, Ind., has plans maturing for an addition for the production of brass castings; a one-story pattern shop will also be built. The entire project is reported to cost close to \$30,000 including equipment.

The Duplex Automatic Nailer Co., Logansport, Ind., has been formed to make automatic nailing machines. Work is being contracted for at present, but the company expects to build a plant in the near future.

Pacific Coast

SAN FRANCISCO, Sept. 14.

L. A. MYERS, 68 Post Street, San Francisco, has awarded a general contract to O. W. Britt, 1257 Arguello Boulevard, for a one-story machine shop to cost about \$23,000.

The Southern California Edison Co., Los Angeles, has arranged for the sale of a bond issue to total \$30,000,000.

a portion of the proceeds to be used for expansion in power facilities and transmission lines. The company has begun foundations for a new steam-operated electric generating plant at Long Beach, Cal., to cost more than \$2,000,000 with transmission system.

The Board of Education, Clarkdale, Ariz., plans the installation of manual training equipment in a new two-story high school to cost about \$125,000. Fitzhugh & Byron, Home Builders' Building, Phoenix, Ariz., are architects.

The Ingram Paper Co., 1112 Santa Fe Avenue, Los Angeles, has asked bids on a general contract for a new one-story and basement storage and distributing plant, 150 x 162 ft., to cost about \$100,000, with loading, conveying, elevating and other equipment. John M. Cooper, Rives-Strong Building, is architect.

The Stone-Tex Brick & Tile Co., Portland, recently organized, has concluded negotiations for the purchase of the local plant of the Sheehy Brick Co., and will take immediate possession. The new owner plans expansion. S. W. Leonard is president of the purchasing company, and R. B. Greenwood, secretary and treasurer.

The American Portland Cement Co., Story Building, Los Angeles, has plans under way for the construction of a new mill in the Cajon Pass district, near San Bernardino, Cal., to cost in excess of \$750,000 with equipment. The company also plans to establish a cement products manufacturing plant in the vicinity of Los Angeles.

The Bellingham Marine Railway Co., foot of C Street, Bellingham, Wash., is reported to be planning the construction of a shipbuilding plant, with initial units to cost in excess of \$90,000 with machinery.

The Lindstrom-Hanforth Lumber Co., Rainier, Wash., is said to be planning the early rebuilding of the portion of its mill destroyed by fire Sept. 10, with loss reported in excess of \$250,000 including machinery.

The Salinas Cold Storage & Ice Co., Salinas, Cal., is completing plans for the erection of a new one-story ice-manufacturing and cold storage plant, to cost about \$150,000 with equipment. The La Faver Engineering Co., 545 Second Street, San Francisco, is engineer.

The Board of Education, Gridley, Cal., plans the installation of manual training equipment in a proposed two-story high school to cost \$175,000, for which plans are being drawn by the Davis-Pearce Co., Grant and Weber Streets, Stockton, Cal., architect.

The Meyer Machinery Co., 1939 Santa Fe Avenue, Los Angeles, dealer in sheet metal-working machinery and machine tools, is in the market for an agency representation for heavy plate working machinery, including punches, shears and rolls. Arthur E. Meyer is secretary.

Canada

TORONTO, Sept. 19.

MACHINE tool sales in single units have shown some improvement the past week or ten days, and local dealers and builders also report an increase in inquiries, some of which include as many as a half-dozen tools. The recent exhibition of machines in this city resulted in a number of good sales. In addition to the current demand, there is a large volume of prospective business in sight which indicates a continuance of orders throughout the remainder of the year. The automotive industry continues the principal buyer of machinery and tools.

Considerable buying is expected in connection with the new works at Tecumseh, Ont., where the Canadian National and Wabash railroads propose to spend upward of \$1,000,000.

Plans have been prepared by James L. Carey, engineer, 208 North Laramie Avenue, Chicago, for a \$1,000,000 factory at Toronto, for the Dominion Boxboards, Ltd., care of Dominion Envelope & Carton Co., 130 Duchess Street, Toronto. The proposed undertaking will include the erection of a machine shop, 55 x 400 ft., stamp and finish stamp mill and beater room, 100 x 120 ft. wide, 660 ft. long. All buildings are to be one-story, of concrete, steel and brick.

The Chatham Malleable Steel Co., 178 Inches Avenue, Chatham, Ont., will start work immediately on a \$5,000 addition to its foundry. F. C. Nicholson, Tilbury, Ont., has the general contract.

Plans are being prepared by Gore, Nasmith & Storrie, engineers, Confederation Life Building, Toronto, for improvements to the waterworks system at Brampton, Ont., to cost \$75,000. Work includes the construction of a new pumping station with equipment; water main extensions; filter plant, etc. Construction work will start next spring.

Bids are being received by Thomas Foster, mayor, chair-

man of the Board of Control, Toronto, until Sept. 27 for the construction of the North Toronto sewage treatment plant and installation of equipment. Specifications may be had at the Department of Works, room 6, City Hall, Toronto.

The Art Furniture Co., 34 Lancaster West, Kitchener, Ont., will build a factory addition, three stories, 25 x 100 ft., metal-clad construction. Dunker Brothers, 58 Louisa Street, have the general contract.

The Newton Construction Co., 165 Portland Street, Sherbrooke, Que., has the contract for the construction of a mill at Thetford Mines, Que., for the Asbestos Corporation, Ltd. It will be four stories, 80 x 180 ft. The engineers are among the owner's staff, Canada Cement Building, Montreal.

A number of contracts have been awarded in connection with a two-story, 30 x 63 ft., addition to the plant of the Booth, Coulter Copper & Brass Co., Ltd., Lovatt Place and Sumach Street, Toronto. H. G. Salisbury, 17 Bowden Avenue, Toronto, is the architect.

The Gananoque Electric Light Co., Gananoque, Ont., has decided to add another 1500-hp. unit to its power plant.

The Lunenburg Foundry Co., Lunenburg, N. S., has started work on an addition to its plant for manufacturing marine engines, stoves, furnaces, ranges, etc. The extension will provide 5400 sq. ft. of additional floor space.

Fire which broke out in the boiler room of the sash and door and furniture factory of the N. F. Beach Co., Winchester, Ont., did damage to the building and equipment estimated at \$200,000. While no statement has been made regarding reconstruction, it is expected that the plant will be rebuilt.

The McClary Mfg. Co., London, Ont., has acquired control of the Thomas Davidson Mfg. Co., Montreal. The consolidation brings together two leading manufacturers of enameled ware, galvanized iron goods, furnaces, ranges, stoves, etc. The McClary company has branches at St. John, Montreal, Toronto, Hamilton, Winnipeg, Calgary, Saskatoon and Vancouver, and the Davidson company has branches at Montreal, Winnipeg, Saskatoon and Vancouver. John C. Newton will continue as head of the Davidson company, which will retain its name and operate under a separate administration. The new company will have a capitalization of \$1,000,000 bonds, \$500,000 of 7 per cent preferred stock and 30,000 shares of no par value common stock.

Donald Ross, King Street, West, has the general contract for the erection of a wire manufacturing plant at Brockville, Ont., for the Eugene F. Electric Works, Ltd.

Western Canada

Huel Brothers have sold their power plant to the Gravelbourg Electric, Ltd., Gravelbourg, Sask. The new owners have started work on the erection of a new power house on Seventh Avenue West, to cost \$75,000.

The Capilano Timber Co., foot of Pemberton Avenue, Vancouver, B. C., will erect a new sawmill unit at a cost of \$200,000, the addition to be one and a half stories, 140 x 420 ft. W. H. Rambo is company engineer.

Foreign

THE Government of France, Paris, has granted a concession to the Societe des Forces Motrices du Haut-Rhin, Paris, for the construction and operation of a hydroelectric generating plant at Kembs Falls on the Rhine River, at the same time approving an appropriation of 65,000,000 francs (about \$13,000,000) for the building of a power dam and accessory work connected with the project. A navigable canal will be constructed in connection with the station. It is expected to begin work soon. The American Consulate, Paris, Thomas Butts, trade commissioner, has information regarding the enterprise.

The United Porto Rican Sugar Co., San Juan, Porto Rico, is arranging for the sale of a bond issue of \$3,000,000 in the United States, a portion of the proceeds to be used for expansion and improvements in mills and properties. The company operates four subsidiaries, known as Puncos Central Co., Central Pasto Viejo, Inc., Caguas Sugar Co., and the Central Cayey, Inc., with four mills and 16,000 acres of land in the eastern part of Porto Rico, including 100 miles of railroad, warehouses and terminals, and other producing and distributing facilities.

Following the completion of the first unit of a new hydroelectric power plant near Lake Como, Italy, the Edison General Electric Co., Milan, Italy, will complete arrangements for the installation of a second unit, doubling the present capacity of 100,000 kw., or ultimate output of 200,000 kw. The station is a project of the Cislalpina Inter-regionale Co., a subsidiary, and has been financed largely through the International Power Securities Corporation, 40 Wall Street, New York.

The Board of Public Works, Las Palmas, Canary Islands, is planning for harbor and terminal construction and improvements to cost about \$2,060,000, including the building

of wharves and warehouses, with installation of cranes, conveying machinery and other mechanical handling equipment.

The German General Electric Co., Berlin, Germany, is planning for the sale of a stock issue of 30,000,000 reichsmarks (about \$7,200,000), a portion of the proceeds to be used for extensions and improvements in power plants, transmission lines, substations, etc.

The Government of the State of Pernambuco, Brazil, is asking bids until Oct. 30 for machinery and equipment for the completion of the new port works at Recife, including material-handling equipment, cold storage plant machinery, etc. Information at the office of the Bureau of Foreign and Domestic Commerce, Washington, reference Brazil No. 254887; also, at the office of the American Consulate, Pernambuco, Nathaniel P. Davis, consul. It is recommended that interested American manufacturers of equipment send catalogs and other literature (in Portuguese or English) to the last noted point.

The Osaka Municipal Office, Department of Commerce

NEW TRADE PUBLICATIONS

Hot-Working Steels.—Carpenter Steel Co., Reading, Pa. Booklet of 22 pages devoted to tool steels for hot work. The theory of the use of steels for dies is gone into and three special alloy steels for making dies are described in some detail, together with the manner of use and treatment recommended.

Mechanical-Drive Turbines.—General Electric Co., Schenectady. Bulletin of eight pages featuring Type D turbines, which are available from 5 to 700 hp., with speeds from 1000 to 5000 r.p.m. They can be arranged to operate at steam pressures up to 400 lb. and temperatures up to 725 deg. Fahr.

Heat Insulation in Steel Plants.—Celite Products Co., Los Angeles. Bulletin 107 of 12 pages shows methods of insulating blast furnaces, stacks, bustle pipes, mains and stoves, open-hearth regenerators and flues, producer gas mains, coke ovens, boilers, soaking pits and various types of reheating furnaces. It is illustrated by line cuts and installation views.

Recording Ammeters.—Bristol Co., Waterbury, Conn. Catalog 1502 of 28 pages describes and illustrates wall ammeters of the recording type, and gives samples of charts. The instruments are for a wide range of uses and the charts are designed accordingly.

Electrical Products.—Crouse-Hinds Co., Syracuse, N. Y. Bulletin 2102, describing fixture hanger condulets for pendant fixtures; Bulletin 2103, dealing with safety hand lamps with grounding terminal, and Bulletin G-6, illustrating an industrial installation of ungrounded power service with grounded and polarized lighting and appliance circuits.

Belt Conveyors.—Link-Belt Co., 910 South Michigan Avenue, Chicago. Data book 615, 148 pages, handsomely bound in limp leather, providing a wealth of information about belt conveyors, their equipment and operation. There are numerous tables, charts and photographs, and the book is adequately indexed for ready consultation on all types of conveyor problems.

Meters.—Worthington Pump & Machinery Corporation, New York. Bulletin W-821, entitled "A Trip Through the Worthington Meter Factory," being a photographic description of the company's meter plant at Harrison, N. J.

Graphic Instruments.—Esterline-Angus Co., Indianapolis. Folder listing some of the applications of graphic instruments to modern industrial uses.

Automatic Electric Melting Pots.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Leaflet L-1868-B, covering the applications for which automatic electric melting pots are suitable and giving interesting operating data, listing the advantages secured by using this apparatus. The pots described have a maximum operating temperature of 950 deg. Fahr. and are largely used for melting soft metals, such as babbitts, and for low temperature drawing baths in the heat treatment of steel tools and parts.

Speed Transmissions.—Reeves Pulley Co., Columbus, Ind. Bulletin T-4075, containing an article on "Mechanical Maintenance of Power Drives," comparing the company's variable speed transmission with variable speed motor installations.

Cycloidal Rotary Pumps.—Connersville Blower Co., Connersville, Ind. Bulletin 19E, dealing with cycloidal rotary pumps for use on lubricating, wash, fuel and hot oils, molasses, cane juices, grease, chemicals, magma,

and Industry of Japan at Osaka, is planning to hold an exhibition of advertising novelties and invites American manufacturers to send samples of such novelties. Samples will be returned to the sender, if desired, after they have been displayed. All advertising novelties sent for display should bear the name of the company using them.

W. Finan & Co., Boite Postale 192, Beyrouth, Syria, have written to THE IRON AGE stating that they are interested in obtaining exclusive sales agencies for American galvanized sheets and corrugated galvanized sheets for Syria and Palestine.

H. Tramer, 8 Rue de la Pépinière, Paris, France, is seeking representation of American manufacturers of metallurgical products in France. His letter to THE IRON AGE states that he speaks and writes English and is able to furnish satisfactory references.

Fox Brothers & Co., 126 Lafayette Street, New York, desire to receive Spanish catalogs of machine tools suitable for use in an electrical shop in South America.

water, tar, etc. Various types of pumps are illustrated and described with comparisons with other kindred equipment.

Roller Bearings.—Hyatt Roller Bearing Co., Newark, N. J. Leaflet dealing briefly with the application of the company's product to blast furnace uses.

Gas Forges.—American Gas Furnace Co., Elizabeth, N. J. Bulletin 3A, devoted to bench forges, regular forges, rivet heaters, glass bending and special forges. The bulletin lists a number of new products recently developed by the company and is well supplied with illustrations and descriptive material.

Industrial Finances

The American Ship Building Co., Cleveland, and subsidiaries, had net income of \$1,743,373 in the year ended June 30. After depreciation and Federal taxes this was equivalent to \$11.52 a share on the 147,144 common shares, compared with \$7.46 a share last year when the company's net profits amounted to \$1,150,121.

Directors of the Reynolds Spring Co. have accepted an offer, and authorized the execution of a contract, for the underwriting of 61,902 shares of the unissued authorized common stock of the company for the benefit of the treasury. Formal announcement has been made, also, of the exchange of 45,360 shares of the unissued common stock of the Reynolds Spring Co. for \$276,200 par value of the 7 per cent preferred stock of the General Leather Co., a subsidiary, which is redeemable at \$105 and accrued dividends.

Following the offering this week of \$1,500,000 of Interstate Iron & Steel Co. 5½ per cent first mortgage sinking fund gold bonds, series B, the company reports net earnings available for bond interest, in the first six months of this year, at \$486,169. After deduction of semi-annual interest on the \$3,800,000 of series A bonds outstanding during the period, Federal taxes and preferred dividends, there should remain a balance for the common stock of more than \$280,000, or slightly over \$7 a share. The balance sheet as of June 30 shows a sizable increase in current assets and working assets. Quick assets at that date totaled \$5,934,694, against \$4,316,475 at the end of the previous year. Current liabilities were \$1,338,262 as compared with \$936,394 on Dec. 31, 1926.

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